





# Regional Alternatives Analysis: Downtown Corridor Supporting Documentation

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# 1. Background

# 1.1 Introduction and Purpose of the Study

This Alternatives Analysis (AA) and Locally Preferred Alternatives (LPA) Report presents the documentation of the development of alternatives, evaluation of alternatives and selection of the preferred alternative by the City of Kansas City and its local agency partners for the *Regional Alternatives Analysis: Downtown Corridor* study in the Kansas City metropolitan area.

This downtown corridor AA is one of a series of efforts that have been undertaken to examine rail service in the downtown corridor. For several years, a variety of studies by a group of local agencies has examined a variety of transit options that would serve the city's primary commercial core. The purpose of this study was to develop, evaluate and select a transit alternative in Kansas City's downtown corridor. The reasons for examining enhanced transit alternatives include:

- To increase mobility between River Market, downtown, Crossroads and Crown Center
- Tie neighborhoods together; serve the residential populations
- Serve as a distributor for transit passengers
- Potentially serve as a first step in the development of a more extensive light rail system in the corridor

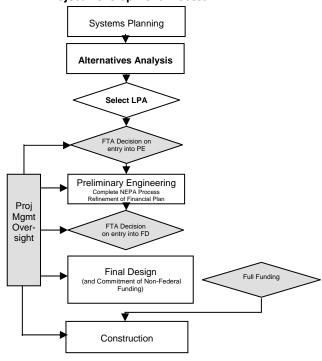
The current study was led by a partnership of local and regional agencies, including:

- City of Kansas City, Missouri,
- Kansas City Area Transportation Authority (KCATA)
- Mid-America Regional Council (MARC), and
- Jackson County, Missouri.

The partner agencies have undertaken this Alternatives Analysis in cooperation with the Federal Transit Administration (FTA). The study was designed to comply with the FTA's planning and project development process. The major steps of the FTA process are shown in Figure 1-1: FTA's Federal Transit Planning and Project Development Process, as shown to the right. Within the larger Project Development Process, the two key steps that have been addressed in this study are the Alternatives Analysis process and selection of the Locally Preferred Alternative (LPA).

The study team has consulted with FTA during the AA study. The study team will continue to work with FTA to move the project forward. There is much work yet to be done, including local planning compliance,

Figure 1-1: FTA's Federal Transit Planning and Project Development Process



compliance with NEPA, and other federal, state and local requirements. The partnership team will continue to work with FTA to complete the Project Development Process, including addressing the requirements of the National Environmental Policy Act (NEPA) and all local planning and regulatory requirements.

## 1.2 Background

Kansas City has examined a variety of planning and transportation options to support the revitalization of the downtown. Like many US cities, downtown Kansas City has experienced dis-investment and urban flight. It has experienced loss of both residents and businesses in the city's primary core area. This downtown corridor alternatives analysis study began in earnest in early 2011. The process has included extensive outreach to the public and stakeholders and has received substantial input from the public, stakeholders (e.g., residents, business owners, etc.) and local, regional, state and federal agencies.

The Kansas City area has an extensive existing transit system provided by the Kansas City Area Transportation Authority (ATA). KCATA is a bi-state agency serving the States of Missouri and Kansas with the responsibility for planning, construction, owning and operating passenger transportation systems and facilities within the seven-county Kansas City metropolitan area. The ATA district includes the counties of Cass, Clay, Jackson, and Platte in Missouri; and Johnson, Leavenworth, and Wyandotte in Kansas. The ATA operates The Metro bus service, the Metro Area Express <a href="http://www.kcata.org/maps\_schedules/max/">http://www.kcata.org/maps\_schedules/max/</a> (MAX) Bus Rapid Transit service, MetroFlex demand-response routes, Share-A-Fare paratransit service for the elderly and persons with disabilities, and AdVANtage vanpool service.

Over more than a decade, there have been a number of transit planning efforts that have examined transit alternatives in Kansas City. All of them have had a major focus on serving the downtown area. Some of the key previous studies include:

- Kansas City Downtown Streetcar Update & TIGER Grant Application, 2009 (and associated supporting reports). Building on the previous studies, an application for TIGER grant funding was prepared by KCATA. The grant request was developed and submitted to FTA for \$6 million to fund continued development of a Streetcar Project in the downtown area. The application was not funded.
- North/South Corridor Alternatives Analysis, 2008 (and associated technical reports). This Alternatives Analysis studied light rail in Kansas City's central North/South Corridor. It concluded that the portion of the alignment between the River Market and the Country Club Plaza has the greatest chance of qualifying for federal funding because this segment has the activity centers and the population and employment density required to support an investment in rail transit.
- Light Rail Study, 2007-2009. In November 2006, the voters of Kansas City, Missouri approved a citizen-initiated ballot initiative to fund a 27-mile light rail transit project from the airport, through downtown to the zoo. The KCATA and the City of Kansas City collaborated on an AA for Phase 1 of the project, which raised a number of concerns about the proposed project. The evaluation concluded that the light rail initiative had major deficiencies, and in November 2007 the Kansas City Council voted to repeal the referendum because of concerns regarding the feasibility and costs.
- Streetcar Feasibility Study, 2004. This study was the first to propose the idea of reintroducing Streetcars to downtown Kansas City as a means to connect the City's downtown landscape of

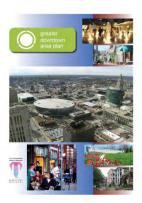


businesses and entertainment districts; linking the River Market, The Central Business District (CBD) and the Union Station / Crown Center area. The intent of this study was to review electric streetcar options for the downtown area and develop a primary concept plan with order-of-magnitude cost estimates for an initial starter line.

The work plan for the downtown corridor AA was designed so that the partner agencies could keep options open to pursue various funding opportunities, including existing and potential Federal funding options for the selected project.

There is strong public policy support for developing a multimodal transportation investment in downtown Kansas City. It will be critical for economic growth and the development of a sustainable future. There are a large number of adopted regional and local policies that provide support for an improved transit circulation in the downtown corridor. Key adopted plan and policy initiatives include:

Greater Downtown Area Plan (City of Kansas City, MO) presents a vision for the greater Kansas City downtown area designed to improve quality of life in the region's core, protect precious natural capital, and strengthen economic vitality to competitively position downtown as the region's cultural, economic, and activity center. The plan explicitly reinforces and embraces dense, mixed-use development in the Central Business Corridor – maintaining downtown as the densest area of the region, a regional office/employment center, the center of government, the most important cultural destination, the center of entertainment/convention/tourism activity, and a significant retail destination. The plan recommends a transit corridor with rail down Main



Street or Grand Boulevard. It also recommends some type of trolley circulator in the downtown area. The plan also calls for increased connectivity between neighborhoods and activity centers, focused on mixed-use activity centers to serve as nodes for the transit system. Transit-Oriented Development is encouraged.

**Smart Moves (MARC)** presents the Kansas City region's vision for expanded and enhanced regional transit service. Kansas City Area Transportation Authority (ATA) or KCATA is a bi-state agency with the responsibility for planning,



constructing and operating passenger transportation systems and facilities within the seven-county Kansas City metropolitan area. The ATA operates The Metro bus service, the Metro Area Express <a href="http://www.kcata.org/maps\_schedules/max/">http://www.kcata.org/maps\_schedules/max/</a> (MAX) Bus Rapid Transit service, MetroFlex demand-response routes, Share-A-Fare paratransit service for the elderly and persons with disabilities, and AdVANtage vanpool service. The existing local and regional transit services will need to be supported by effective local transit circulator services, especially in the downtown corridor. The Smart Moves plan explicitly recognizes that transit service in key corridors needs to evolve to more intensive operational modes, such as bus rapid transit (BRT) and rail transit, as development intensifies over time.

**KCATA Comprehensive Service Analysis (KCATA)** designed to develop short-term transit improvements to existing Metro services. Work to date has determined that service in downtown Kansas City is overly complex, and that the development of a downtown – Crown Center "spine" would provide the foundation for simpler and more efficient service with downtown and in the downtown corridor.



Transportation Outlook 2040 (MARC) is the Kansas City Region's long-range transportation plan guiding how the Kansas City region will manage, operate and invest \$18 billion in its multimodal transportation system over the next 30 years. It is designed to help the region grow more efficiently, maintain a competitive economy and preserve the health of the environment, while enabling everyone to access opportunity. The plan lists "Place Making" as one of its nine system goals driving policy, with such objectives as walkability, density/mixed uses, transportation options, and infill/redevelopment.





**Climate Protection Plan (City of Kansas City, MO)** lays out goals for the City of Kansas City to reduce its greenhouse gas emissions while simultaneously improving the economy and quality of life for the City's businesses and citizens. Several of the plan's recommendations are in harmony with the goals of the downtown corridor alternatives analysis, including the following:

- expand and further develop alternative transportation programs,
- develop a plan to implement light rail as part of a healthy overall public transit system,
- promote and incentivize development patterns that support alternative modes of transportation and avoid sprawl,
- reduce emissions by reducing net vehicle-miles traveled,
- enact a "complete streets" policy, and
- create a seamless regional transit system.

Rail-based transit has also been envisioned in transportation plans, land-use plans and previous studies for the downtown corridor. Downtown voters have consistently supported rail transit; for example, although the November 2008 light-rail ballot failed citywide with only 45 percent of voters in support, 64 percent of the voters of Ward 1 (most of the downtown area) voted in support. In addition, an Alternatives Analysis is being undertaken concurrently to evaluate potential commuter rail service between the eastern suburbs and downtown Kansas City. Such service would likely intersect with, and be complementary to, a downtown circulator.

# 1.3 Corridor Study Area

The Corridor Study Area encompasses the Central Business District of Kansas City Missouri. The Corridor extends from the River Market area on the north, through the Central Business District and the Crossroads areas to Crown Center on the South. Figure 1-2 on the next page illustrates the study area, and the air photo on the following page (Figure 1-3) shows the general the area of downtown Kansas City that is included in the study area. More detailed information on the Study Area is in included in Chapter 3, the Description of Alternatives.

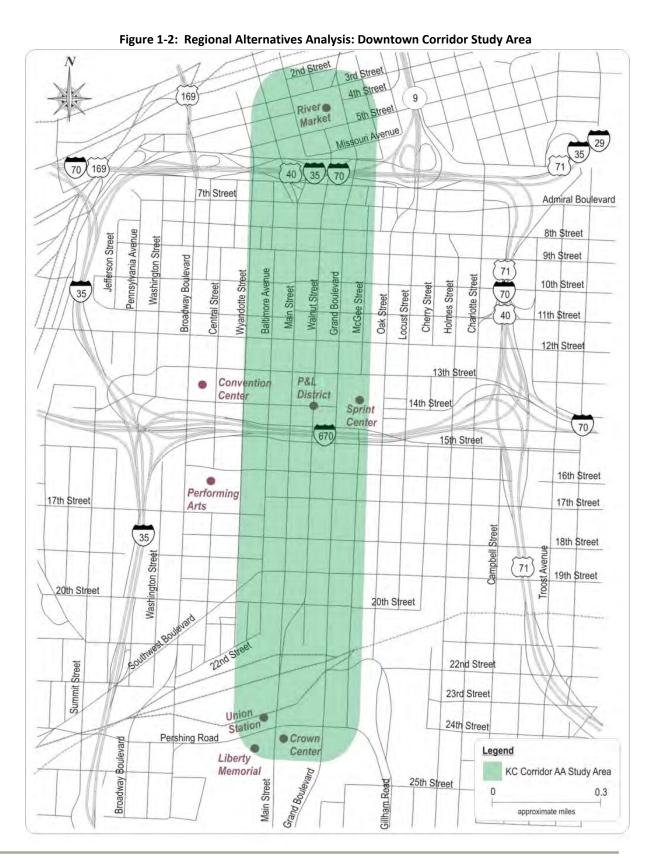










Figure 1-3: Air Photo View of Downtown Corridor Study Area

# 1.4 Study Organization

As noted in the introduction section, this Downtown Corridor Alternatives Analysis study is a cooperative effort between several partner agencies, including:

- City of Kansas City, Missouri;
- Kansas City Area Transportation Authority (KCATA);
- Mid-America Regional Council (MARC); and,
- Jackson County, Missouri.

This partnership has undertaken the Alternatives Analysis to examine enhanced transit solutions in Kansas City's downtown Corridor.

Early in the AA study, a leadership team was formed to manage the study. The leadership team was made up of a senior staff members from each of the partner agencies. The leadership team served as the project Executive Committee and provided day-to-day direction to the project staff and consultants.



# 2. Purpose and Need

#### 2.1 Introduction

A critical part of every Alternatives Analysis process is the development of the Purpose and Need Statement. Fundamental to the Purpose and Need Statement is a thoughtful process of defining what problem(s) the study is attempting to resolve. Also critical to the development of the Purpose and Need Statement is the articulation of the Goals and Objectives of the study. The Purpose and Need Statement is used to define a series of promising alternatives, and further to guide the development of evaluation criteria for evaluating the alternatives. The development of the Purpose and Need Statement has drawn strongly from previous studies in the area. The purpose of this chapter is to document these critical steps in the *Regional Alternatives Analysis: Downtown Corridor Study*.



Early in the study, the project partners developed draft Goals and Objectives, and a draft Purpose and Need Statement. The draft was presented to the public at an open house. After revisions were made based on the public input, it was adopted by the partnership team for the study.

## 2.2 Existing Transit Service in the Downtown Corridor

## 2.2.1 Existing Transit Services

Most existing KCATA transit service operates to and from downtown Kansas City, Missouri. Figure 2-2: Existing Downtown Transit Service, on the next page, illustrates the existing transit service in the study area. All of the existing service is bus service, and includes two BRT routes, local bus routes, express routes, and one Flex route. Routes that operate from the south and that serve Crown Center continue north through the Downtown Corridor to the Financial District, the Government District and the River Market area. There are 13 of these routes, one of which is a BRT route, eight of which are local routes, and four of which are express routes:

#### **BRT**

Main Street MAX

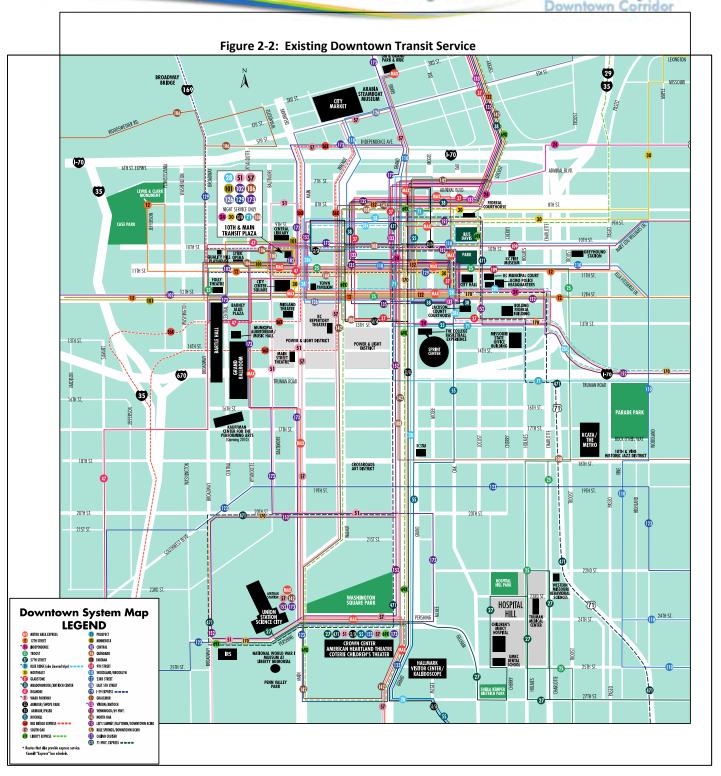
#### Local

- 57 South Oak
- 53 Armour-Swope Park
- 54 Armour-Paseo
- 28 Blue Ridge
- 51 Broadway
- 55 Rockhill
- 142 North Oak
- 173 Casino Cruiser

#### **Express**

- 69X Liberty Express
- 152 Lee's Summit Raytown Express
- 170 Blue Springs Express
- 471 71 Highway Express

# **Regional Alternatives Analysis:**



The existing BRT service (Main Street MAX) is the corridor's major bus route. It was designed to provide fast service from neighborhoods and business districts in the Main Street, Brookside Boulevard and Broadway corridor, which are south of the Downtown Corridor. Within the downtown corridor, from south to north the Main Street MAX operates somewhat circuitously. It operates on Main Street, 16<sup>th</sup>



Street, Wyandotte Street, 11<sup>th</sup> and 12<sup>th</sup> Streets, Oak Street, 8<sup>th</sup> and 9<sup>th</sup> Streets, and Grand Boulevard. Main Street MAX makes only limited stops and was designed to provide service to and from the Downtown Corridor. With its limited stops, it was not designed to provide circulator service within the corridor, but is still used for many trips of this type. Main Street MAX provides the most frequent service in the corridor, and operates every 10 to 15 minutes during the day.

The local north-south routes are primarily designed to provide service between neighborhoods and the Downtown Corridor. Within the Downtown Corridor, most local routes operate along Grand Boulevard. However, service on some routes is split between Grand Boulevard and Main Street, Walnut Street, or Oak Street. Similar to Main Street MAX, the local routes are not designed primarily to serve trips within the corridor, but are used frequently for this purpose. The local routes generally operate every 15 to 30 minutes during peak periods and every 30 to 60 minutes during the day and evening (see Table 2-1: Existing Transit Routes Serving Crown Center and Downtown KCMO (as of 1-1-2012)

The four express routes are designed to bring commuters in and out of the Downtown Corridor, and are not designed, nor are they used, for trips within the corridor. These routes only provide peak period service, and some operate only in the peak direction.

In addition, and as is shown in Figure 2-2: Existing Downtown Transit Service, KCATA also operates a large number of east-west routes, both to and from the Financial and Government Districts, and across the Downtown Corridor. Most east-west routes connect with most north-south routes, and would also connect with new Downtown Corridor service.

Table 2-1: Existing Transit Routes Serving Crown Center and Downtown KCMO (as of 1-1-2012)

Route Name/Number	Predominant	Fre	Frequency (minutes)	
Route Name/Number	North-South Alignment	Peak	Midday	Evening
BRT				
Main Street MAX	Main	10	15	30
Local				
28 Blue Ridge	Grand	20*	40	
51 Broadway	Grand/Main	20-30	45	
53 Armour-Swope Park	Grand	15-30	30-60	60
54 Armour-Paseo	Grand	15-30	30-60	26-60
55 Rockhill	Grand/Oak	3 trips**		
57 South Oak	Walnut/Main	30	60	60
142 North Oak	Walnut - inbound	20	60	
	Grand - outbound			
173 Casino Cruiser	Primarily Main	60-65	65	60
Express				
69X Liberty Express	Grand AM	2 trips**		
	Walnut PM			
152 Lee's Summit Raytown Express	Grand	4 trips**		
170 Blue Springs Express	Grand	4 trips*		
471 71 Highway Express	Grand	5 trips*		

Notes: \*Southbound only; \*\* Peak direction and peak hour only



## 2.2.2 Currently Planned Changes to Existing Transit Service

KCATA recently completed a Comprehensive Service Analysis that is designed to improve service throughout the city. Recently adopted recommendations will be implemented in the second half of 2012 and early 2103, and will simplify service in the Downtown Corridor. Following implementation of the proposed changes, with only one exception, north-south services will be reconfigured to operate along either Main Street or Grand Boulevard. Other key changes will include:

- Route 47 Roanoke will be rerouted to operate through the Downtown Corridor.
- Routes 53 Armour-Swope Park and 54 Armour-Paseo will be consolidated into a single route.
- Route 57 South Oak will be consolidated with Main Street MAX to provide more frequent service on Main Street MAX.
- Route 142 North Oak will be rerouted to operate along Grand Boulevard in the Downtown Corridor.
- Route 173 Casino Cruiser will also be rerouted to operate along Grand Boulevard in the Downtown Corridor

Express routes from the north will be extended from the Financial District to Crown Center Service frequencies will also be revised to better match service levels with demand, and to provide more consistent service (see Table 2-2). And finally, KCATA desires to simplify bus circulation in the Financial and Government Districts. This effort will take place in Phase 2 of this project in conjunction with detailed planning for the LPA.

Table 2-2: Planned Transit Service Following the CSA

Doute Name /Number	Predominant	Frequency (minutes)		tes)
Route Name/Number	North-South Alignment	Peak	Midday	Evening
BRT				
Main Street MAX	Main	10	10	15
Local				
47 Roanoke	Main	30	30	60
51 Broadway	Main	20-30	45	60
54 Armour-Paseo	Grand	30	30	60
142 North Oak	Grand	20	60	60
173 Casino Cruiser	Main	60	60	
Express				
36X Metro North Express	Grand	4 trips**		
69X Liberty Express	Grand AM	2 trips**		
	Walnut PM			
132 Gracemor	Grand	2 trips**		
135 Winwood	Grand	2 trips**		
152 Lee's Summit Raytown Express	Grand	4 trips**		
170 Blue Springs Express	Grand	4 trips*		
471 71 Highway Express	Grand	5 trips*		

Notes: \*Southbound only; \*\* Peak direction and peak hour only



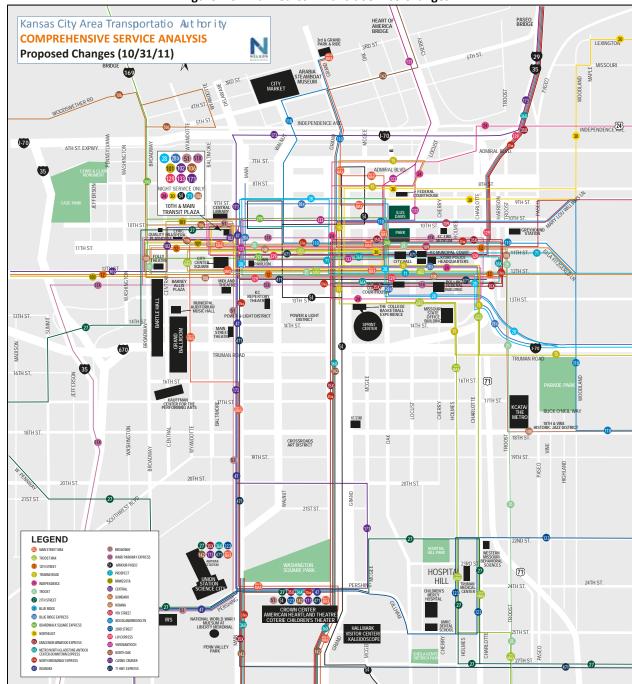


Figure 2-3: Planned CSA Transit Service Changes



#### 2.3 Corridor Problems

The *Regional Alternatives Analysis: Downtown Corridor Study* was initiated to address a number of transportation and land use problems, challenges, issues and opportunities in the downtown area. The problems that the downtown corridor study would address are described below. The problems identified provide the foundation for the Goals and Objectives, and Purpose and Need Statements which are presented in the following this sections.

## 2.3.1 Land Use and Transportation Plans and Policies

Regional and local plans and policies envision improved transit circulation in the downtown corridor. These key plan and policy initiatives can only be realized if additional transit is developed in the downtown corridor. A brief summary of these policy documents includes:

- Smart Moves MARC. This Regional transportation plan assumes that transit service in will evolve in key corridors to more intensive transit operation modes, such as bus rapid transit (BRT) and rail transit, as land uses intensify over time. Without more intensive transit service in the downtown Corridor, it would be difficult to implement or realize this regional plan.
- ♦ 2011 Comprehensive Service Analysis (CSA). KCATA is in the process of conducting a transit system service planning effort. A key element of the KCATA transit system is its focus on the downtown area. The planning effort recognizes is the need for a downtown circulation plan, and distinguishes between service to downtown and service within downtown. The plan will define service design guidelines and otherwise configure the transit system for optimal function with available resources.
- Greater Downtown Area Plan (GDAP) Kansas City, MO. This plan envisions dense, mixed-use development in the Central Business Corridor. It seeks to maintain downtown as the highest density area of the region, as a regional office/employment center, as the center of government, as the most important cultural destination, as the center of entertainment, convention, tourism activity, and as a significant retail destination. This plan recognizes that development of a transit corridor with rail down Main Street or Grand Boulevard is a primary tool to achieve the plan. It also recommends a trolley circulator in the downtown to reduce dependence on autos for short trips between activity centers and to improve mobility in the downtown. The plan recognizes the need for increased connectivity between neighborhoods and activity centers. Transit system improvements are required to achieve the Transit-Oriented Development that is envisioned. The plan identified walkability as the first of its five overarching goals, which is only achievable with more transit service.
- Transportation Outlook 2040 MARC. This regional long-range transportation plan has a policy agenda that is centered on the idea of activity centers and corridors strategically concentrating growth and development. The plan lists "Place Making" as one of its nine system goals driving policy, with such objectives as walkability, density/mixed uses, transportation options, and infill/redevelopment.
- Fixed Guideway Transit Alternatives Analysis Concurrent with this Downtown Corridor AA Study, a separate Alternatives Analysis is being undertaken to evaluate potential commuter rail service between the eastern suburbs and downtown Kansas City. The future commuter rail service is being planned to intersect with, and be complementary to, the downtown circulator. Success of the commuter rail project is highly dependent upon connections to a strong local transit circulation system in the downtown.



## 2.3.2 Transportation

In downtown Kansas City, there are limited linkages between activity centers. The need is to improve transportation options for local circulation. Transportation and transit problems include:

- Transit Circulator. There is poor connectivity between downtown activity centers such as (River Market, downtown, Crossroads, and Crown Center). Currently, these major destinations are geographically separate. Existing transit services, including MAX BRT service are designed to bring people to and from downtown, but there are no services designed to facilitate shorter trips within the Downtown Corridor. Better service for short trips is needed throughout the day, and also for special events such as "First Fridays", Sprint Center events, and other events throughout the downtown.
- Complete Transit System. Downtown transit service is evolving in conjunction with efforts to strengthen the downtown core. The current transit system is not "complete" in that it does not serve visitors and convention attendees sufficiently well, it does not provide "last mile" connectivity from regional services, either existing or planned). The lack of a strong downtown circulation is a major deficiency in the existing system.
- Improve the Pedestrian Environment and Accessibility. The Downtown Corridor is very autooriented, with wide streets and few buffers between vehicles and cars, which discourages many from walking. The development of a more transit-oriented environment, especially on one of the corridor's major arterials, will also improve the pedestrian environment and encourage more people to walk.
- Parking. A large amount of land in the Downtown Corridor is devoted to surface parking lots. Better
  downtown transit circulation would connect older buildings that do not have parking with available
  parking structures associated with newer development. This would result in better utilization of the
  available structured parking and reduce the need for surface parking lots.
- Future Congestion. Without better transit service, auto-based congestion will increase with the
  projected residential and employment growth. Conversely, better transit would allow the corridor to
  become less auto oriented.
- Access to Parks and Recreation Facilities. Park resources are concentrated at the ends of the downtown corridor. The Riverfront Heritage trail is currently difficult to access because it is somewhat isolated and disconnected from the more active parts of the downtown area. A new riverfront redevelopment plan is underway that seeks to expand activity in this area. However, without improved transit, these areas will be difficult to access without a car.

# 2.3.3 Land Use and Economic Development

The number of residents and jobs in downtown Kansas City has been declining for many years as the region has grown outward. The region's policy initiatives are focused on supporting reinvestment and revitalization of the downtown corridor study area, but surrounding areas are providing significant



<sup>&</sup>lt;sup>1</sup> Refer to Downtown Kansas City Transit Circulation Challenges Memorandum.

incentives for businesses to relocate out of downtown. As a result, to complete effectively, Kansas City, MO, needs to improve infrastructure and services in the downtown corridor:

- Keeping Businesses Downtown. Downtown Kansas City needs to retain and expand existing
  businesses and attract new businesses. The market advantages of downtown needs to be improved
  in order to stop business departures, as well as attract new businesses
- Support New Downtown Activity Centers. A significant amount of development (Sprint Center, Power and Light District, Performing Arts Center, etc.) has occurred in recent years that is designed to strengthen downtown's role as the cultural and civic center, and initiate a resurgence in vitality. Ongoing, visionary investments are needed to support continuation of this resurgence.
- Encourage Development and Redevelopment. At the present time many downtown parcels are underutilized. The Greater Downtown Area Plan (GDAP) and other downtown planning initiatives encourage better utilization of underutilized parcels and surface parking lots, support re-filling empty storefronts and vacant office space, and encourage Transit-Oriented Development. Supporting infrastructure investments and services such as improved Downtown Corridor transit services are needed to support these efforts.
- Attract new Housing and Residents. GDAP has a goal to double the downtown's population in order to make it a more active, vibrant place with activity from early morning until late at night. Supporting infrastructure and services, such as improved Downtown Corridor transit services, will also be needed to support attract new residents.
- Proved a Catalyst for Redevelopment. Catalysts are needed for development and redevelopment. Although transit investments such as the MAX BRT system have improved downtown transportation options, it has not served as a major catalyst for redevelopment. The development of more attractive transit service, such as streetcar service, would be expected to accelerate development and redevelopment.
- ◆ Improve Service for Transit-Dependent Populations. Existing transit services have been designed primarily to bring people in and out of downtown from outlying areas, with less emphasis on serving local trips within the corridor. A significant number of residents are transit-dependent, and provision of an accessible and affordable downtown transit system with level-boarding service would better serve elderly and transit-dependent populations in the central area.

# 2.4 Goals and Objectives

The goals identified for the study are consistent with the Kansas City region's vision for the future, and form the basis for the Purpose and Need Statement for the Alternatives Analysis study. Each goal has a related list of objectives. The objectives provide guidance for attaining each goal, represent successive levels of achievement in movement toward the goal, and reflect the expected results achieved during the planning horizon for the project. The goals and objectives are the foundation for the project's Purpose and Need Statement and Evaluation Criteria.



# Goal 1: CONNECT - Enhance Linkages in Downtown Kansas City and Improve Local Circulation

#### **Objectives:**

- Provide more focused and easily-accessed transit options within and between downtown and Crown Center.
- Connect key activity centers and population centers.
- Develop a transit spine around which existing transit services can be more effectively organized.
- Expand transit choices and improve local circulation to attract new riders.
- Serve as an initial "building block" in the region's desired rail transit system.
- Enhance mobility throughout the corridor; integrate with other elements of the existing transportation system (e.g., transit, automobile, pedestrian, bicycle).
- Facilitate car-free travel by residents, employees, and visitors, including convention attendees.
- Provide effective connections to planned/future commuter rail service.
- Support future system expansion to other neighborhoods.
- Develop an initial system with a capital cost and annual operating cost that are financially sustainable.
- Encourage support (conceptual, political, and financial) for transportation solutions from property owners near the route, including institutions, businesses, and developers.
- Facilitate the development of complete streets (roadways designed and operated to enable safe, attractive and comfortable access and travel for all users, including pedestrians, bicyclists, motorists and public transit users of all ages and abilities).
- Recognize the expressed intent of voters in the downtown area to build a rail system that serves the downtown corridor.

# **Goal 2: DEVELOP - Support Local and Regional Economic Development Goals**

#### **Objectives:**

- Support existing employment centers in downtown, Crossroads, and the Crown Center/Union Station areas.
- Support existing residential development centers in the River Market, Crossroads and the Crown Center/Union Station areas.
- Spur new development throughout the corridor.
- Encourage higher-density, mixed-use land use patterns consistent with local and regional plans and to better support transit.
- Convert underutilized surface parking lots to transit-oriented mixed-use development.
- Reduce the amount of parking that will be associated with new development.



- Minimize impacts of future congestion due to new development and redevelopment in the downtown area.
- Refill empty office buildings.

## Goal 3: THRIVE - Strengthen Downtown Districts and Urban Centers

#### **Objectives:**

- Enhance quality of life and access to corridor destinations for residents, employees and visitors to the downtown area.
- Support the strength and character of existing neighborhoods; provide access to cultural facilities, retail, parks, and entertainment venues.
- Enhance access to, and the vitality of existing activity centers.
- Support convention, cultural and special event activities.
- Support the development of new activity centers in the corridor.
- Increase the safety and security of the transportation system for transit users, vehicles, bicyclists and pedestrians.

#### Goal 4: SUSTAIN - Create an Environment that will be Sustainable Over Time

#### **Objectives:**

- Preserve the historic character of the downtown area by supporting the re-use of vacant and underutilized historic buildings and promote appropriately scaled infill development.
- Provide more environmentally friendly transportation options.
- Reduce the amount of space devoted to parking.
- Reinforce a pattern of development that creates fewer greenhouse gas emissions through higher residential densities and lower per capita vehicle miles traveled.

## 2.5 Purpose and Need Statement

For much of the last 20-plus years, Kansas City's core, although it remained the most important economic engine of the region, has declined as more business and residents have moved to newly developing areas surrounding the core, or elsewhere in the region. A major emphasis of many regional efforts is to revitalize and grow the core. Improved transit within the Downtown corridor must be an essential part of these efforts.

## 2.5.1 Statement of Purpose

The purpose of the project is to provide an attractive transit option that will more conveniently connect people and places within the Downtown Corridor, and support regional and city efforts to develop and redevelop downtown Kansas City and the Downtown Corridor as a more attractive and successful urban center.



#### 2.5.2 Statement of Need

The need for this project is best expressed through four themes related to mobility and connectivity, economic development and growth, community and livability, and sustainability. This project is needed to help the downtown corridor **connect**, **develop**, **thrive**, and **sustain**.

#### CONNECT: Enhance Linkages in Downtown Kansas City and Improve Local Circulation

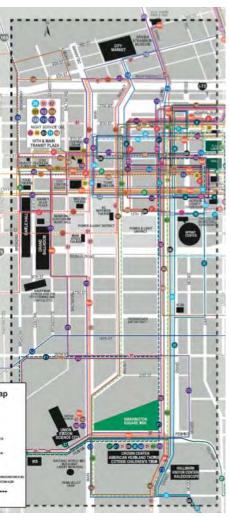
In downtown Kansas City, there is a need for enhanced linkages between activity centers to improve transportation options for local circulation. Transportation and transit issues include:

- Improve Circulation within the Downtown Corridor. The downtown corridor includes a number of activity centers—River Market, downtown, Crossroads, and Crown Center—that are geographically isolated. The existing transit system is configured to connect core areas with the larger region; the downtown portions of these radial routes do not function well as local circulators. In particular, the Main Street MAX BRT line serves the corridor. However, it was designed primarily to connect the Main Street corridor south of Crown Center with Crown Center and downtown, rather than provide circulation within the downtown corridor. A major function of downtown corridor circulator service would be to serve trips within the corridor, including by visitors and attendees at special events such as First Fridays, Sprint Center events, and conventions.
- Connect Downtown Activity Centers. Downtown Kansas City is the home of numerous regional activity centers. As the core of the region, it is the logical and established cultural and civic center. Recent developments (Sprint Center, Power and Light District, Performing Arts Center, etc.) have reinforced downtown's regional prominence and have initiated a resurgence in the study area's vitality. Ongoing, complementary transit investments that serve the particular mobility needs of this urban community are needed to sustain this resurgence.
- Enhance and Integrate Multimodal Transportation Options.

  There is a need to further the goals of transit system integration, complement the existing bus and MAX systems, provide "last mile" connectivity for regional transit trips, provide distribution for future commuter rail, provide circulation for visitor and convention attendees, and, reduce the need for short auto trips in the downtown area.

Improve Effectiveness and Efficiency of Existing Transit Services. Service in downtown is overly complex (see Figure 2-2), and downtown corridor service could provide the spine for an overall restructuring of downtown and corridor services. An effective and easily understood downtown circulator route could improve the usability of the larger transit system.

Figure 2-4: Complexity of Existing Downtown Transit Service

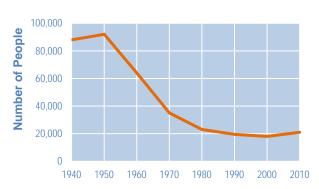


- Improve the Pedestrian Environment and Accessibility. Increased walkability and pedestrian activity is a key goal in the downtown area. Even relatively short trips along this corridor are now often taken by automobile. Additional transportation options need to be developed that would encourage more walking throughout the study area.
- Access to Parks and Recreation Facilities. Park resources are generally concentrated at the ends of the downtown corridor. The Riverfront Heritage trail is currently difficult to access because it is somewhat isolated and disconnected from the more active parts of the downtown area. A new riverfront redevelopment plan is underway that seeks to expand activity in this area, and as new residential projects re-fill the downtown core, residents will need access to these parks.

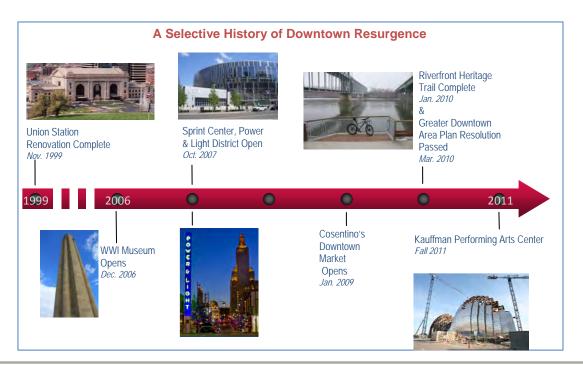
# DEVELOP: Support Local and Regional Economic Development Goals

Employment and housing has steadily declined in downtown Kansas City for decades, from a high of over 90,000 residents in the 1950s to under 20,000 in 2000. Still, the downtown corridor remains home to the greatest concentration of transportation, employment, medical, educational, visitor and cultural facilities in the Kansas City metro area, and the corridor's economic health and vitality are

#### **Downtown Population Trends**



important to the entire metro area. The past decade has seen major investments begin to transform (and restore) the downtown area into an attractive and vibrant destination (see graphic below). These significant investments need to be coupled with the return of residents and services to the downtown area. In recent years, housing stock and population in the downtown corridor have increased (2010 population was 22,576) even while the City as a whole has experienced decreases.





However, the ability for these positive trends to continue is hampered by excessive dependence on automobile travel with resulting issues of parking supply and policies (described more fully below). Much of the redevelopment to date could be described as "urban, but automobile-dependent." Continuation of redevelopment with high automobile mode usage will be counterproductive. In addition, recent significant incentives offered by the State of Kansas have caused some key businesses to move out of the downtown and across the state line, undermining some of the progress that has been made. Meanwhile, the region's policy initiatives are focused on supporting reinvestment, revitalization and a high-quality pedestrian environment in the study area. An integrated transit system in the urban core will improve mobility, economic development and community livability from both the local and regional perspectives, serving the people who live, work, and visit here, and reinforcing the positive trends now beginning to reverse previous decline.

Land use and economic issues in the corridor include:

- Encourage Development and Redevelopment. The Greater Downtown Area Plan and other
  downtown planning initiatives encourage better utilization of underutilized parcels and surface
  parking lots, support re-filling empty storefronts and vacant office space, and encourage TransitOriented Development.
- Provide Catalyst for Redevelopment. Public infrastructure investments are needed as a catalyst for development and redevelopment of vacant and underutilized parcels. Although transit investments such as the MAX BRT system have improved downtown transportation options, fixed-guideway transit has been shown to also serve as a catalyst for redevelopment, which traditional bus transit generally cannot accomplish.
- Increase Number of Downtown Residents. The Greater Downtown Area Plan's goal is to double the
  downtown population, which will require building more housing as well as replacing housing that
  has been lost.
- Support Downtown's Historical Urban Fabric and Form. Downtown Kansas City was built around a vibrant streetcar system. From the late 1890s to the mid 1940s, with peak annual ridership of 136 million in 1922, streetcars were the predominant mode of transportation, and literally shaped the downtown's urban form. Hence, much of the downtown area was laid out with streetcar-based transportation in mind, and is "under-parked" for access by automobile, and transportation options should support and respect this pattern of urbanism.



Walnut Street in the late 1910s

Support Transit-Oriented Development/ Minimize the Need for Parking. Parking policies in downtown Kansas City do not currently support the residential/ employment density envisioned by future plans. Currently, new development must be accompanied by parking ratios that reflect an automobile-dominated transportation system. Transit planning in the downtown area needs to be better integrated with parking policy to result in more efficient use of land and recognition of walking and transit as primary transportation modes downtown. As the Study Area develops and redevelops, improved downtown corridor transit service can significantly reduce the need for additional parking and attendant automobile traffic and traffic congestion increases.



### THRIVE: Strengthen Downtown Districts and Urban Centers

- Strengthen Downtown Districts and Urban Centers. The downtown corridor comprises a "string" of distinct districts or centers. Each has a unique character; each is only partially realized since significant redevelopment opportunities remain in each as well:
  - The Crown Center/Union Station area contains a mixture of major regional institutions and attractions, including Union Station, the World War I Museum, Penn Valley Park, the existing Crown Center and major additions to it now under development including the Sea Life Aquarium and Legoland Discovery Center, as well as a small amount of housing.
  - The Crossroads District is a very urban, but lower-scale mixed use neighborhood, with a lively mixture of art galleries and arts-related businesses, housing, restaurants and small employers.
  - The Sprint Center/Power & Light District is a major attractor, with large and small civic and cultural facilities and community gathering places, as well as restaurants, retail and entertainment businesses.
  - The downtown core is, as noted above, the historic center of office employment for the region for both the private and public sectors.
  - The River Market district is both an urban residential neighborhood and the venue for the region's largest public market, with additional attractions and smaller businesses in the mix as well.
- **Support Existing Businesses.** The development of a stronger downtown corridor will increase business activity, which will increase business for existing enterprises, encourage existing businesses to stay, and attract new business.
- Provide Additional Services for Residents. At present, because there are now relatively few
  residents in the corridor, there are also relatively few services aimed at residents. The development
  of a stronger downtown corridor that attracts more residents will also attract new services for
  existing and added residents.
- Support Visitor and Tourism Activities. Most of the region's convention and tourism assets are in the Study Area. Kansas City's existing public transit system is designed around employment, and additional mobility options are needed to connect convention facilities, entertainment venues and hotels, which otherwise require short auto/taxi trips.
- ♦ Avoid Future Congestion. Auto-based congestion will increase with Bartle Hall Convention Center the planned residential and employment growth, if it is developed with parking ratios typical for "urban, but automobile-dependent" development. However, auto-based capacity improvements involving new right-of-way are impractical due to physical constraints and would be counterproductive to the downtown goals.
- Serve Transit-Dependent Populations. As housing increases in downtown, transit-dependent populations (including the elderly and those with disabilities) will locate close to accessible transportation if it is available. Provision of an accessible downtown transit system with level-boarding service would attract elderly and transit-dependent populations to the central area.



#### SUSTAIN: Create an Environment that will be Sustainable Over Time.

Downtown planning points to a need to create an environment that will promote long-term sustainable development, with development patterns that are less automobile-oriented and support environmental goals. Achieving a more transit-oriented pattern of development as redevelopment occurs will significantly reduce per capita vehicle miles traveled, the most significant contributor to greenhouse gas emissions.

#### 2.6 Evaluation Criteria

The evaluation process for this AA study included two levels of screening of alternatives. Tier 1 examined a variety of north-south alignments in downtown Kansas City to determine which alignments could best serve the transit needs, but was mode-neutral. The Tier 2 screening examined mode (bus and rail) and alignment (on Main Street and Grand Boulevard) alternatives (the most promising alignments resulting from the Tier 1 screening).

Both the Tier 1 and the Tier 2 evaluation criteria were developed from the Purpose and Need Statement and the supporting Goals and Objectives. These were all organized around four themes and project goals that included:

- Connect: Enhance linkages in downtown Kansas City and improve local circulation
- **Develop**: Support local and regional economic development goals
- Thrive: Strengthen downtown districts and urban centers
- Sustain: Create an environment that will be sustainable over the long term

The Purpose and Need Statement includes a series of objectives related to each project goal. These objectives guided the development of a series of evaluation criteria that were used in both the Tier 1 and Tier 2 evaluation processes. The criteria further defined each objective and support evaluation of the alignments and alternatives against the stated goals in a transparent and understandable manner. These evaluation criteria, grouped by study goal, are listed in Table 2-1, on the following page.

# Table 2-3: Kansas City Downtown Corridor Evaluation Criteria for Tier 1 and Tier 2 Evaluation of Alternatives

CONNECT: Enhance Linkages in Downtown Kansas City and Improve Local Circulation		
Objective	Evaluation Criteria	Presentation
<ul> <li>Improve circulation within the downtown Corridor</li> <li>Improve transportation options</li> </ul>	<ul> <li>Ability to provide "last mile connectivity"</li> <li>Connections with existing transit system</li> <li>Potential connections to future services (regional rail)</li> </ul>	<ul> <li>Tier 1</li> <li>Discussion of connections with other existing transit services</li> <li>Discussion of intermodal connections</li> <li>Discussion of potential connections with future services such as regional rail</li> </ul>
•Improve connections between existing downtown activity centers	Number of activity centers served     Quality of transit connections between activity centers and alignment	<ul> <li>Tier 1</li> <li>Number of activity centers within ¼ mile of proposed alignment and stations</li> <li>Tier 2</li> <li>Number of activity centers within ¼ mile of proposed alignment and stations</li> <li>Walking times to/from major activity centers</li> </ul>
•Improve pedestrian and bicycle environment	Ouality of pedestrian and bicycle connections     Potential for improvements to pedestrian and bicycle infrastructure	Tier 1  Current primary road configuration  Discussion of quality of bicycle and pedestrian connections  Qualitative assessment of potential for future improvements  Tier 2  Quality of bicycle and pedestrian environment and facilities

Objective	Evaluation Criteria	Presentation
<ul> <li>Support development and redevelopment</li> <li>Provide catalyst for new development and redevelopment</li> </ul>	<ul> <li>Comparisons of existing economic conditions and current growth trends</li> <li>Capacity for future growth</li> <li>Economic development potential</li> </ul>	<ul> <li>Tier 1</li> <li>Existing conditions and current growth trends:</li> <li>Square feet of vacant land within ¼ mile of alignment</li> <li>Current value of developed and vacant land within ¼ mile of alignment</li> <li>Improvement potential of vacant parcels within ¼ mile, including large parcels</li> <li>Tier 2</li> <li>Existing conditions and current growth trends:</li> <li>Employee, population, and housing growth</li> <li>Projection of medium term development capacity of alternative</li> <li>Comparison of maximum projected increases in market value in next 15 years</li> <li>Qualitative assessment of downtown real estate market and economic development potential</li> </ul>
Increase number of downtown residents	Vacant land suitable for residential redevelopment	Tier 2  • Qualitative assessment of downtown real estate market and economic development potential
Support larger "catalyst" development projects	Significant concentrations of vacant and re-developable parcels	<ul> <li>Tier 1</li> <li>Number and acres of large parcels (&gt;1 acre) within ¼ mile of alignment</li> <li>Tier 2</li> <li>Qualitative assessment of downtown real estate market and economic development potential</li> </ul>

Objective	Evaluation Criteria	ters Presentation
Support existing residential and employment centers	Connections with residential and employment centers	Tier 1  • Population and employment within ¼ mile of alignment Tier 2  • Population, employment, and households within ¼ mile of stations
Support visitor and special event activities	Proximity to visitor and special event venues	<ul> <li>Tier 1</li> <li>Major hotels, hotels room, special event venues, and attendance within mile of alignment</li> <li>Tier 2</li> <li>Major hotels, hotels room, special event venues, and attendance within mile of stations</li> </ul>
Improve service to transit dependent populations	<ul> <li>Number of low income and zero- vehicle households, and the minority, elderly, and disabled population with access to high capacity transit</li> </ul>	<ul> <li>Tier 1</li> <li>Number of low-income and zero-vehicle households within ¼ mile of alignment</li> <li>Minority, elderly, and disabled population within ¼ mile of alignment</li> <li>Tier 2</li> <li>(This criterion was not carried forward as Tier 1 indicated few difference</li> </ul>
Incorporate public and stakeholder input  SUSTAIN: Create an Environ	Strong support/opposition from affected populations     mment that Will be Sustainable	<ul> <li>Tier 1</li> <li>Inventory and summary of public comment about individual alignments</li> <li>Tier 2</li> <li>Same as Tier 1</li> </ul>
Objective	Evaluation Criteria	Presentation
<ul> <li>Develop cost effective transit solutions</li> <li>Improve effectiveness and efficiency of existing transit service</li> <li>Optimize return on public investment</li> </ul>	<ul> <li>Potential to improve effectiveness and efficiency of existing transit service</li> <li>Ridership</li> <li>Operating costs</li> <li>Capital Costs</li> <li>User benefits</li> <li>Cost-effectiveness</li> </ul>	Tier 1  Ability to provide strong transit spine Tier 2  Ridership  Operating costs  Capital costs  User benefits  Cost effectiveness:  Cost per new corridor transit rider  Cost per hour of user benefits
Provide reliable transit service	<ul> <li>Ability to provide dependable service without gaps</li> </ul>	Tier 1  Number of partial and full day street closures Tier 2  Same as Tier 1
Convert surface parking to higher value uses	<ul> <li>Surface and structured parking available</li> </ul>	<ul> <li>Tier 2</li> <li>Acres of surface and structured parking within ¼ mile of alignment</li> <li>Qualitative assessment of redevelopment potential</li> </ul>
Impact on utilities and their potential need for modification or relocation	<ul> <li>Location, size, and number of utility lines</li> <li>Negative impacts on communication lines</li> </ul>	<ul> <li>Utility impact score</li> <li>Alignment ranking from major communication companies</li> </ul>
Provide sustainable	Potential to attract diverse set of  private and public sector funding.	Tier 2
funding for corridor		- Description of funding strategies



• Assessment of traffic impacts (positive and negative) on corridor vehicular

• Inventory and assessment of impacts on natural resources within ¼ mile

• Inventory and assessment of impact on historic resources within ¼ mile of

private and public sector funding

• Impacts on natural resources

• Impacts on historic resources

Impacts on air quality

funding for corridor

improvements and operations

resources

Improve air quality

• Minimize/mitigate impacts

on natural and historic

Tier 2

• Description of funding strategies

of each alignment

each alignment

# 3. Alternatives Considered

### 3.1 Introduction

As described in Chapter 1, this downtown corridor AA is one of a series of efforts undertaken to examine improved transit service in the downtown corridor. Most recently, in 2008 and 2009, KCATA conducted the North-South Alternatives Analysis that examined the development of a regional light rail system that would have included service through the downtown corridor. That study never selected an LPA because a proposed sales tax initiative that would have funded the system failed, which made the selection of an LPA moot. However, that study did develop a short-list of five downtown corridor alignments, all of which were on existing roadways or short sections of new rights-of-way, and could be used by streetcar, enhanced bus, or regular bus service.

Typically, Alternatives Analyses such as this consist of the development of a Tier 1 "long-list" of alternatives that are screened to a short-list of Tier 2 alternatives that are then evaluated in detail. However, in the case of the alignments identified in the North-South AA, all could be used equally well by any modes, as could other parallel streets that were raised as potential alignments in the initial phases of this study. As a result, to take advantage of the earlier work and to expedite the process, the approach used in this study was to use the Tier 1 screening to shortlist alignments, and then to develop Tier 2 alternatives that consisted of different combinations of modes and the shortlisted alignments. Consistent with that approach, this chapter describes the Tier 1 alignments and the Tier 2 alternatives.

## 3.2 Tier 1 Alignments

Seven different alignments were identified and evaluated during Tier 1. They consisted of four "bi-directional" alignments in which service would operate in both directions on the same street, and three "couplet" alignments in which service would operate northbound along one street, and southbound along a parallel street. In the case of streetcar service, the couplet alternatives were viewed as a possible way to expand development-related benefits from one street to two. The seven alignments evaluated included (see also Figure 3-1 and Figure 3-2):

#### **Bi-directional Alignments**

- Grand Boulevard
- Main Street
- Walnut Street
- Baltimore Avenue

### **Couplet Alignments**

- Grand Boulevard/Walnut Street
- Walnut Street/Main Street
- Main Street/Baltimore Avenue





Figure 3-1: Tier 1 Bi-Directional Alignments





Figure 3-2: Tier 1 Couplet Alignments



All alignments would run from a northern terminus at 3<sup>rd</sup> Street near Grand Boulevard in the River Market District<sup>2</sup> to a southern terminus at Union Station or Crown Center. All alignments would also serve the heart of downtown, Crossroads, and Crown Center.

Finally, along with each primary alignment were multiple alignment options at the north and south ends. At the north end, between Admiral Boulevard and 3<sup>rd</sup> and Grand, three different alignments were considered, which were Delaware Street, through River Market, and Grand Boulevard. At the south end, service could terminate at either Union Station or Crown Center. Furthermore, at Crown Center, service could terminate on Pershing Road or Grand Boulevard.

#### Alignment 1: Grand Boulevard

Alignment 1 would operate between Union Station or Crown Center east on Pershing Road, and then between Crown Center and the Financial District via Grand Boulevard. From the Financial District, service would most likely operate to 3rd and Grand directly via Grand Boulevard or through River Market (the feasibility of which was investigated during the Tier 2 analysis).

This alignment would serve one of the corridor's two major streets, as well as the Sprint Center. Grand Boulevard would bring service closest to the Federal District but farthest from the Convention Center and Kauffman Center.

#### Alignment 2: Main Street

Alignment 2 would begin service at either Crown Center or Union Station in the same manner as Alignment 1. It would then operate directly along Main Street to the Financial District. From the Financial District, it would operate to 3<sup>rd</sup> and Grand in a manner similar to Alignment 1, via one of three options:

- North on Delaware Street to east on 3<sup>rd</sup> Street
- East on Admiral Boulevard, north on Walnut Street through River Market, and east on 3<sup>rd</sup> Street
- East on Admiral Boulevard, north on Walnut Street, east on Missouri Street, and north on Grand Boulevard

This alignment would operate on the second of the corridor's two main streets and through the center of the downtown core. It would split the distance between the Sprint Center and the Convention Center and Kauffman Center, and directly connect with KCATA's 10<sup>th</sup> and Main transit center. However, Main Street is farther to the west of the Federal District.

#### Alignment 3: Walnut Street

Alignment 3 would operate between Crown Center or Union Station and River Market primarily along Walnut Street. If service began at Crown Center, it would operate west on Pershing Road, north on Main



<sup>&</sup>lt;sup>2</sup> Note, however, that if the Regional Rail AA, which is being conducted concurrently with this AA, recommends that regional commuter rail service operate to the River Market area, then the northern terminus would be extended north along Grand Boulevard to the railroad tracks to provide connections between the two services.



Street, and north on Walnut Street to the Financial District. If service began at Union Station, it would start on Main Street along the side of Union Station near the entrance to The LINK and would operate north on Main Street to Walnut Street. From the Financial District, service would operate via one of three alignments:

- West on Admiral Boulevard, north on Delaware Street, and east on 3<sup>rd</sup> Street
- North on Walnut Street through River Market to east on 3<sup>rd</sup> Street
- North on Walnut Street, east on Missouri Street and north on Grand Boulevard.

This alignment would "split the difference" between Grand Boulevard and Main Street, which are the corridor's two primary streets.

## Alignment 4: Baltimore Avenue

Alignment 4 would operate mostly along Baltimore Avenue, plus Main Street along its southern and northern ends. Service would begin at either Crown Center or Union Station in the same manner as Alignment 2. Then, from Union Station, it would operate north on Main Street, west on 20<sup>th</sup> Street, north on Baltimore Avenue, east on 10<sup>th</sup> Street past the 10<sup>th</sup> and Main transit center, and then north on Main Street. From the Financial District, it would operate to 3<sup>rd</sup> and Grand along the same potential alignments as Alignment 3 Main Street.

This Alignment would provide service along the west side of the corridor, closest to existing residential neighborhoods, the Convention Center, and the Kauffman Center. However, it would be farthest from the Federal District and the Sprint Center.

### Alignment 5: Grand Boulevard/Walnut Street

Alignment 5 would primarily operate northbound on Grand Boulevard and southbound on Walnut Street (which would require that Walnut Street be converted to two-way traffic, or that its direction be reversed from northbound to southbound). Northbound service would operate in the same manner as Alignment 1 from either Union Station or Crown Center east on Pershing Road, north on Grand Boulevard to the Financial District, and then through River Market to 3<sup>rd</sup> and Grand.

Southbound service would operate from 3<sup>rd</sup> and Grand either south on Grand Boulevard to west on Missouri Street to Walnut Street or west on 3<sup>rd</sup> Street to south though River Market to Walnut Street. It would then operate south on Walnut Street, east on 20<sup>th</sup> Street, south on Grand Boulevard, and then along Grand Boulevard and Pershing Road back to its southern terminal.

This couplet alignment would provide similar service as a combination of Alignments 1 and 2, and would focus service toward the eastern side of the corridor.

### Alignment 6: Walnut Street/Main Street

Alignment 6 would primarily operate northbound on Walnut Street and southbound on Main Street. Northbound service would operate in the same manner as Alignment 2 and southbound service would operate in the same manner as Alignment 3.





This couplet alignment would provide similar service as a combination of Alignments 2 and 3, and would focus service toward the middle of the corridor.

## Alignment 7: Main Street/Baltimore Avenue

Alignment 7 would primarily operate northbound on Main Street and southbound on Baltimore Avenue. Northbound service would operate in the same manner as Alignment 3 and southbound service would operate in the same manner as Alignment 4.

This couplet alignment would provide similar service as a combination of Alignments 3 and 4, and would focus service toward the western side of the corridor.

### 3.3 Tier 2 Alternatives

As described in detail in Section 4.1, the Tier 1 screening process recommended further study of the Grand Boulevard and Main Street Alignments. For these two alignments, modal alternatives were further developed and evaluated in the Tier 2 Screening. For the Tier 2 evaluation, the alternatives were developed as follows:

- The Build alternatives examined streetcar service along Grand Boulevard and Main Street. The examination of streetcar service was the impetus for the study, and financial limitations precluded the evaluation of more expensive options such as a more extensive light rail system. The two Build Alternatives—Grand Boulevard Streetcar and Main Street Streetcar—are shown in Figure 3-3.
- The No Build alternative, which is consistent with FTA procedures, consisted of existing transit services plus those improvements that are currently planned for future implementation. Changes that are planned and would be made in any event are those that are currently being planned as part of KCATA's Comprehensive Service Analysis (CSA).

The TSM (enhanced bus) alternatives, which are consistent with FTA procedures, were defined to consist of lower-cost bus alternatives (when compared to the Streetcar Build alternatives) that would still produce meaningful service improvements. The TSM alternatives would provide high-quality, or "Enhanced Bus" service along Grand Boulevard and Main Street. The two TSM Alternatives—Grand Boulevard Enhanced Bus - and Main Street Enhanced Bus - are shown in Figure 3-4.

Key elements of the alternatives are summarized in Table 3–1 and described in the following sections. To the greatest extent possible, the Streetcar and Enhanced Bus alternatives were designed to provide as similar service as possible, while also taking advantage of the unique characteristics of each.



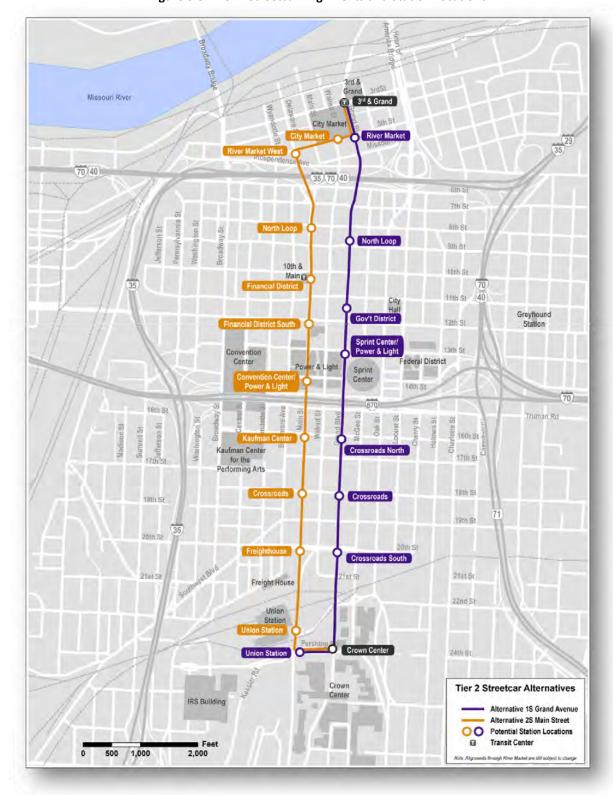


Figure 3-3: Tier 2 Streetcar Alignments and Station Locations





Figure 3-4: Tier 2 Enhanced Bus Alignments and Stop Locations



Table 3–1: Major Features of Tier 2 Alternatives

	No-Build	Build: Streetcar	TSM: Enhanced Bus	
Vehicle Technology	Existing mix of MAX and local bus service	Modern streetcar	MAX-style buses	
Stations	Existing MAX stations and local bus stops	Similar to enhanced bus but with longer shelter and platform lengths, and on-vehicle ticketing	MAX-like stations and amenities plus off-vehicle ticketing	
Operations	Continuation of existing bus routes with CSA improvements	Operation on existing streets, primarily in mixed traffic	Operation on existing streets, primarily in mixed traffic	
Station Locations	Existing locations only	Approximately every two blocks	Approximately every two blocks	
Transit Priority	Peak period bus lanes in some areas along Main Street MAX	<ul> <li>Bulb outs at some side station locations</li> <li>Limited sections of streetcar only operation</li> <li>Traffic signal priority at some intersections</li> <li>Separate streetcar signal phases at some intersections</li> </ul>	<ul> <li>Queue jump lanes at signalized intersections</li> <li>Limited areas with bus only lanes</li> <li>Traffic signal priority at some intersections</li> </ul>	
Roadway and Traffic Changes	Existing traffic configurations maintained (which includes peak period bus lanes in some areas)	<ul> <li>For the Main Street         alternative, Main Street         converted to 2 lanes in each         direction</li> <li>On both Main and Grand, left         turns prohibited at some         intersections</li> </ul>	For the Main Street alternative, Main Street converted to 2 lanes in each direction with center left-turn lane south of the Loop	

Source: Nelson\Nygaard, October 2011.

### 3.4 Overview of Modern Streetcar Service

Modern streetcar service, as the name implies, would consist of rail service provided with modern streetcars (see Figure 3-5). This service would be similar to light rail service but with the following differences:

- Service would be provided with single-vehicle trains
- Service would largely operate in mixed traffic
- Stations would be spaced more closely (due to the circulator nature of the service)
- Stations would be smaller in scale (largely due to the shorter train length)

However, even with these differences, the basic infrastructure (such as rails, overhead wires, stations, etc) would be the similar as for light rail. As a result, in the future, light rail service from outer locations could also operate along the streetcar tracks.

Figure 3-5: Portland and Seattle Modern Streetcar Service





Source: www.flickr.com/photos/sp8254/2681192785; www.milwaukeeconnector.com/vehicles.html

### Modern Streetcar Vehicles

Modern streetcars are single-unit low-floor vehicles with articulated sections that allow them to navigate tight turns (see Figure 3-6). They typically carry approximately 30 seated passengers and 100 standing passengers; this configuration is common because most trips are short and standing is often convenient. They also have interior room for on-board fare vending and bicycles.

Modern streetcars are typically powered by overhead catenary, although some can travel for short distances using battery power. (New technologies are now under development that would allow for underground power supply, but there are none in production or operation yet.) The vehicles are designed for in-street mixed-traffic operation and can also operate in exclusive environments.

Figure 3-6: Modern Streetcar Vehicle (Kinkisharyo AmeriTram and United Streetcar)





Source: Kinkisharyo; Wikipedia



### Streetcar Stations

Streetcar stations are generally of a similar scale as bus stops, with similar length platforms (because the platforms do not need to extend the full length of the vehicles) and facilities. As illustrated in Figure 3-7, Portland's streetcar stops are relatively basic, and Tacoma's are more elaborate. For this study, it is assumed that facilities for both streetcar and enhanced bus services would be similar to KCATA's MAX station facilities (as illustrated below in the Enhanced Bus section).

Figure 3-7: Portland Bulb-Out Station and Tacoma Side Platform Station





Sources: Light Rail Now; Transportation Choices Blog (http://www.lightrailnow.org/news/n\_000007.htm)

The layout and design of a individual stations would be dependent on a number of factors including:

- The location of the stop in the roadway (curbside or median)
- The location of the stop with respect to an intersection (near or far-side)
- The dimensions and configuration of the streetcar vehicle, including presence of doors and ADA boarding locations
- The availability of space (including sidewalk) behind the street curbs and within the right of way
- Station facilities
- The presence or absence of on-street parking at the site of the stop
- Americans with Disabilities Act (ADA) Standards for Accessible Design
- State/local codes and regulations

Minimum platform lengths will need to match the low-floor boarding area from the first door to the last door. The length can vary among streetcar manufacturers, but most stations require 60 to 70 feet of length. Curbside stations require about eight feet of width and bi-directional median stations require about 10 feet of width. For curbside stations, that width can be provided through curb bulb-outs or through use of the sidewalk. Platform heights are typically 14 inches.

## Streetcar Operations

Streetcar service would operate in mixed-traffic in nearly all areas. Exceptions would be at the two terminals along Pershing Road and the terminal stub at 3rd and Grand in the River Market. As described in more detail in the description of individual alternatives, depending upon the alternative and street segment, streetcar service would be either curb or center running.

### **Stop Locations**

Stops would be located approximately every two blocks, at the approximate locations presented below in the description of the individual alternatives.

### **Transit Priority**

Three different types of transit priority could be used:

- Exclusive rights-of-ways at the terminal locations (on Pershing Road and 3<sup>rd</sup> and Grand).
- Transit signal priority at key intersections. Signal priority could be used to hold lights green for approaching streetcars and shorten red times for streetcars stopped at intersections. Signal priority locations that could be used have not yet been defined. These would be defined as the design is advanced.
- Separate signal phases at intersections where streetcars would need to operate across general traffic lanes.

## Fare Collection

Streetcar fare collection could be via ticket purchases from ticket machines on the Streetcar Vehicles or at the stations; or a free fare system could be used. Typical onboard ticket vending machines and validators are shown on Figure 3-8).

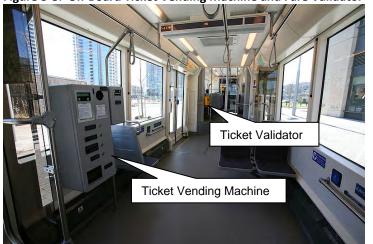


Figure 3-8: On-Board Ticket Vending Machine and Fare Validator

Source: Wikipedia (<a href="http://en.wikipedia.org/wiki/Automated\_Fare\_Collection\_System">http://en.wikipedia.org/wiki/Automated\_Fare\_Collection\_System</a>)

## 3.5 Overview of Enhanced Bus Service

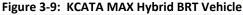
Enhanced Bus service would consist of high-quality bus service that would provide similar service as Streetcar service. Its physical attributes would be very similar to existing Main Street and Troost MAX service, but it would serve short trips within the downtown corridor. In summary:

- Service would be provided with Diesel-Electric Hybrid BRT buses.
- Stations would be similar to Main Street and Troost MAX stations.
- Stations would be spaced approximately every two blocks.

### **Enhanced Bus Vehicles**

Enhanced Bus service could use a similar vehicle as KCATA's new Troost BRT service, which are 42-foot hybrid diesel-electric BRT vehicles (see Figure 3-9).







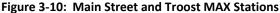
Source: KCATA; Gillig

### **Stations**

Enhanced Bus stations would be similar to KCATA's MAX station facilities (see Figure 3-10). These stations have attractive shelters, seating, pillars that make the station easy to locate and identify, and real-time passenger information.









Source: KCATA

## **Enhanced Bus Operations**

With limited exceptions (as described in the description of the individual alternatives) Enhanced Bus service would operate in mixed-traffic.

### **Station Locations**

Stations would be located approximately every two blocks, at the approximate locations described below in the description of the individual alternatives.

### Transit Priority

Two different types of transit priority could be used for the downtown corridor transit options:

- Queue jump lanes at signalized intersections to reduce signal-related delays would include special lanes that allow buses to bypass congested intersections. As illustrated in Figure 3-11, they can allow buses to use curbside lanes, including right turn lanes, to bypass congestion in general traffic lanes. Queue jump lanes can also be used in conjunction with transit signal priority through which buses are given a green light slightly before the general traffic lanes.
- Transit signal priority at key intersections (similar intersections as with streetcar service). Signal priority would hold lights green for approaching vehicles and shorten red times for vehicles stopped at intersections.

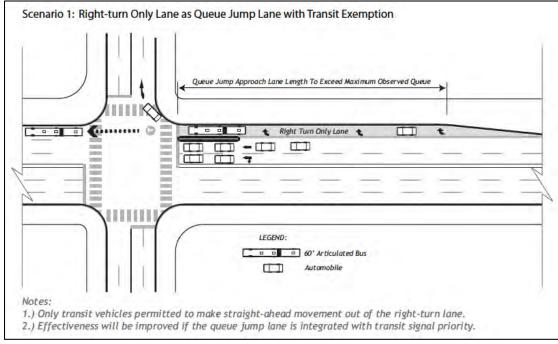


Figure 3-11: Queue Jump Lane Example

Source: Valley Transit Authority BRT Service Design Guidelines

### Fare Collection

Since buses do not have the same amount of interior room as streetcars, and to avoid boarding delays, passengers would purchase tickets from ticket vending machines located at the stations rather than as they board the bus (see Figure 3-12).



Source: Community Transit (Flyertalk.co)



## 3.6 Description of Tier 2 Alternatives

### 3.6.1 No Build Alternative

KCATA currently operates 12 north-south routes between Crown Center and the Financial District with the highest quality and most frequent service provided by Main Street MAX. Main Street MAX mostly operates on Main Street but also deviates off Main Street to provide service directly to the Convention Center and east-west service through the Financial and Government Districts. Other north-south services are concentrated on Main Street, Walnut Street, and Grand Boulevard. Johnson County Transit also operates bus service on various streets in the study area.

Johnson County Transit (The Jo) provides eleven commuter routes from various origins to Downtown Kansas City, Missouri, as shown in Figure 3-13. Once they reach the downtown area, those routes travel along four different alignments. All Johnson County Transit routes approach from the south on I-35. Three of the four alignments use Main Street as a major north-south spine through the downtown area.

As can be seen in Figure 3-14 and Table 3–2, KCATA's current downtown services are complex; KCATA is working to better rationalize the service. KCATA is currently completing a Comprehensive Service Analysis of all of its Kansas City, Missouri routes, and that study is expected to produce improvements to most KCMO bus services. In some cases, these improvements may result in the consolidation of some services between Crown Center and the Financial District, including Route 57 South Oak, which is the local service counterpart to Main Street MAX, with Main Street MAX in order to provide more frequent midday and evening Main Street MAX service. The specific changes that are being considered as part of the Comprehensive Service Analysis are still being determined and will not be finalized until early 2012.

Figure 3-13: Johnson County Transit Routes in downtown Kansas City



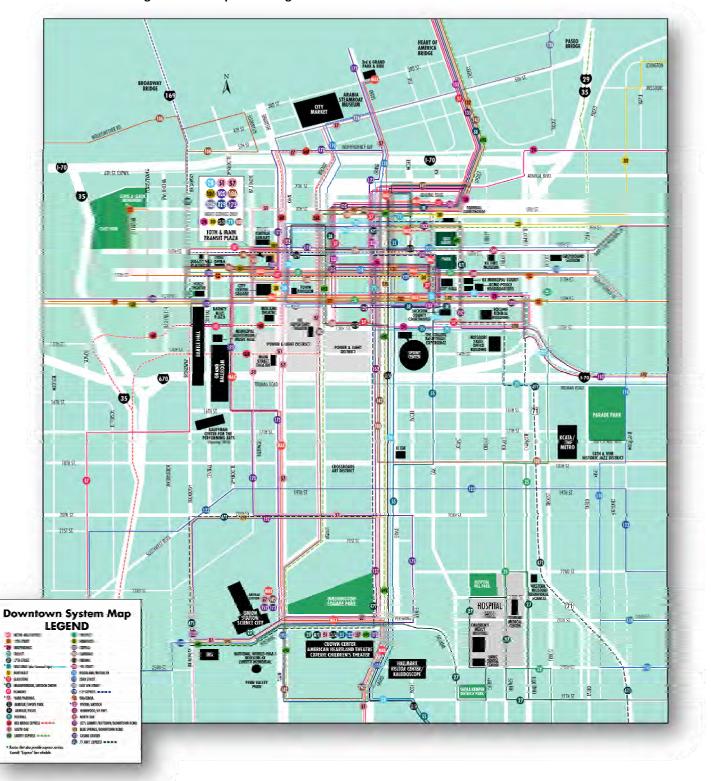


Figure 3-14: Map of Existing KCATA Downtown Corridor Bus Service

Table 3-2: Existing KCATA Bus Routes Serving Crown Center and Downtown Kansas City

	Routing into	<b>Destination in</b>	Frequency		
Route Name/Number	Downtown	Downtown KCMO	Peak	Base	
Main Street MAX	Main	3rd/Grand Park and Ride	10	15	
Route 57 South Oak	Walnut/Main	3 <sup>rd</sup> /Grand Park and Ride	30	60	
Route 53 Armour-Swope Park	Grand	Admiral/McGee	15-30	30-60	
Route 54 Armour-Paseo	Grand	Admiral/McGee	15-30	30-60	
Route 28 Blue Ridge	Grand	8 <sup>th</sup> /Main	20*	40	
Route 51 Broadway	Grand/Main	10 <sup>th</sup> /Main	20-30	45	
Route 55 Rockhill	Grand/Oak	Admiral/McGee	3 trips**		
Route 69X Liberty Express	Grand AM/Walnut PM	8 <sup>th</sup> /Walnut	2 trips**		
Route 142 North Oak	Walnut inbound Grand outbound	Grand/Admiral	20	60	
Route 152 Lee's Summit Raytown	Grand	10 <sup>th</sup> /Main	4 trips**		
Route 170 Blue Springs Express	Grand	Grand/10th	4 trips*		
Route 471 71 Highway Express	Grand	Pershing/Grand	5 trips*		

Notes: \*Southbound only; \*\* Peak direction and peak hour only

## 3.6.2 Grand Boulevard Streetcar Alternative

As illustrated in Figure 3-3, and for the purpose of the Tier 2 analysis, the Grand Boulevard Streetcar Alternative transit service would operate from Crown Center to River Market along Pershing Road and Grand Boulevard. In combination with the streetcar elements described above, key features of this alternative would include:

**Alignment/Operations:** From south to north, two-way streetcar service would operate within a single stub end track along Pershing Road. Between Pershing Road and I-70, streetcar service would operate in the center lanes of Grand Boulevard. Between I-70 and 3<sup>rd</sup> and Grand, streetcar service would operate within the single lane of travel in each direction.

Stations: Stations would be spaced approximately every two blocks as show in Table 3–3.

Table 3–3: Grand Boulevard Streetcar Alternative Potential Station Locations

Location
Pershing at Grand
Grand at Pershing
Grand at 20th
Grand at 18th
Grand at 16th
Grand at 13th
Grand at 11th
Grand at 9th
Grand at 5th
Grand at 3rd

**Service Levels**: For the Tier 2 analysis, it was assumed that the Grand Boulevard streetcar service would operate seven days a week, with service from 6:00 am to 12:00 midnight Monday through Thursday, from 6:00 am to 2:00 am on Fridays and Saturdays, and from 8:00 am to 9:00 pm on Sundays (see Table 3–4). Service would operate every 10 minutes except on weekdays after 9:00 pm and on Sundays, when it would operate every 20 minutes.

Table 3-4: Grand Boulevard Streetcar Alternative Span of Service and Frequencies

Day / Service Hours	Service Frequency (minutes)
Monday - Thursday	
6 am - 9 pm	10
9 pm - 12 pm	20
Friday and Saturday	
6 am - 2 am	10
Sundays	
8 am - 9 pm	20

**Transit Priority:** Two types of transit priority could be used to speed up the service. These could include:

- Transit signal priority at key intersections (locations have not yet been determined).
- Exclusive streetcar-only phases at intersections where streetcar service at the terminals where streetcars would enter and exit from general purpose travel lanes.

**Transit Integration:** With streetcar service on Grand Boulevard, changes would be made to KCATA's downtown services to operate east-west service past or close to streetcar stations. In addition, to the extent possible, north-south routes would also be reconfigured to provide connections with streetcar service. However, KCATA's 10<sup>th</sup> and Main Transit Plaza would remain the primary downtown transit center, and thus connections with all routes would not be possible.

## 3.6.3 Main Street Streetcar Alternative

As illustrated in Figure 3-3, and for the purpose of the Tier 2 analysis, the Main Street Streetcar Alternative transit service would operate from Crown Center to River Market via Pershing Road, Main Street, 5<sup>th</sup> Street, and Grand Boulevard.

**Alignment/Operations:** With only limited exceptions, Main Street streetcar service would operate in mixed-traffic. Those exceptions would be short streetcar-only segments at the southern terminal along Pershing Road and in and out of the 3<sup>rd</sup> and Grand terminal in River Market. Along Main Street between Pershing Road and Truman Road, service could operate in the center lanes with center platforms in order to preserve parking—during off-peak periods or possibly all day—in the curb lanes. North of Truman Road, where parking is generally prohibited, service could operate in the curb lanes with stations located on the sidewalks. On 5<sup>th</sup> Street and Grand Boulevard in River Market, service could operate within the single travel lane with stations located on bulb-outs from the sidewalk.

**Station Locations:** As with Grand Boulevard streetcar service, stations would be spaced approximately every two blocks at the locations listed in Table 3–5.



Table 3-5: Main Street Streetcar Alternative Potential Station Locations

Station	Location
Crown Center	Pershing at Grand
Union Station	Main beneath The Link
Freighthouse	Main at 20th
Crossroads	Main at 18th
Kauffman Center	Main at 16th
Convention Center/Power & Light	Main at Truman
Financial District South	Main at 12th
Financial District	Main at 10th
North Loop	Main at 8th
River Market West	5th Street at Main
City Market	5th at Walnut
3rd and Grand	Grand at 3rd

**Service Levels:** For the Tier 2 analysis, it was assumed that the Main Street streetcar service would operate seven days a week, with service from 6:00 am to 12:00 midnight Monday through Thursday, from 6:00 am to 2:00 am on Fridays and Saturdays, and from 8:00 am to 9:00 pm on Sundays. However, whereas Grand Boulevard would operate every 10 or 20 minutes, Main Street streetcar service would operate every 11 or 22 minutes (see Table 3–6). This is because the Main Street alignment would be slightly longer, and in order to keep the peak streetcar vehicle requirements at three, it would be necessary to operate at slightly longer headways.<sup>3</sup>

Service would operate every 11 minutes except on weekdays after 9:00 pm and on Sundays, when it would operate every 22 minutes.

Table 3–6: Main Street Streetcar Alternative Span of Service and Frequencies

	Service Frequency (minutes)
Monday - Thursday	
6 AM - 9 PM	11
9 PM - 12 PM	22
Friday and Saturday	
6 AM - 2 AM	11
Sundays	
8 AM - 9 PM	22

Traffic and Parking Changes: Two types of changes would likely be made with streetcar service:

South of 14<sup>th</sup> Street, where service would operate in the median lanes south of 14<sup>th</sup> Street, left turns would be prohibited at intersections with center stations.



<sup>&</sup>lt;sup>3</sup> Note, however, that the operating plans that were developed as part of this study were designed to be conservative, and as part of the design of the project, it may be possible to determine additional transit priority measures that would speed service sufficiently to operate service at 10 and 20 minute headways.

 Between 14<sup>th</sup> Street and 9<sup>th</sup> Street, where service would operate in the curb lane, on-street parking would be eliminated.

**Transit Priority:** Three different types of transit priority would be used to speed streetcar service. These would include:

- The dedicated streetcar segments at the terminals (as described above).
- Transit signal priority at key intersections.
- Separate signal phases at intersections where streetcars would need to operate across general traffic lanes.

**Transit Integration:** With streetcar service on Main Street, it was assumed for analysis purposes that Main Street MAX would be relocated from Main Street to Grand Boulevard. This assumption would provide premium service on both of the corridor's primary arterials. In addition, changes would be made to operate east-west service past or close to streetcar stations. Changes would also be made to north-south routes to provide connections with streetcar service. Many of these connections would be provided at KCATA's 10<sup>th</sup> and Main Transit Plaza, which would be directly served by Main Street streetcar service.

### 3.6.4 Grand Boulevard Enhanced Bus Service Alternative

As was illustrated in Figure 3-4, the Grand Boulevard Enhanced Bus service was assumed to operate from Crown Center to River Market via Pershing Road and Grand Boulevard.

**Alignment/Operations:** Grand Boulevard enhanced bus service would operate along the same alignment as Grand Boulevard streetcar service. One exception would be that enhanced bus service would start at the front door of Union Station rather than Pershing Road at Main Street. This would be because there would be no additional cost for the more direct service, as this outer loop would be the most efficient bus turnaround.

In terms of operations, and from south to north, service would operate in mixed-traffic south of the Loop, but with queue jump lanes at most signalized intersections to avoid delays. Within the Loop, service would operate in curbside exclusive bus lanes during peak periods, and in mixed-traffic during off-peak periods. North of the Loop, service would operate in mixed-traffic with queue jump lanes at key intersections.

**Station Locations:** Stations would be at the same locations as with Grand Boulevard (as described above) except that the southern terminal would be located directly in front of Union Station instead of on Pershing Street at Main Street.

**Service Levels:** Grand Boulevard enhanced bus service would operate every 10 to 20 minutes, seven days a week, in the same manner as Grand Boulevard streetcar service.

**Transit Priority:** Three types of transit priority would be used to speed service. These would include:

- Queue jump lanes at signalized intersections north and south of the Loop.
- Peak period exclusive bus lanes within the Loop.



Transit signal priority at key intersections.

**Roadway and Parking Changes:** Enhanced bus service would operate in the right hand general traffic lanes, but with queue jump lanes at signalized intersections. Some on-street parking would be eliminated to develop the queue jump lanes.

**Transit Integration:** As with streetcar service on Grand Boulevard, changes would be made to KCATA's downtown services to operate east-west service past or close to enhanced bus stations. In addition, to the extent possible, north-south routes would also be reconfigured to provide connections with the service. However, KCATA's 10<sup>th</sup> and Main Transit Plaza would remain the primary downtown transit center, and thus direct connections with all routes would not be possible.

### 3.6.5 Main Street Enhanced Bus Service Alternative

As was illustrated in Figure 3-4, for purposes of the Tier 2 evaluation the Grand Boulevard Enhanced Bus service was assumed to operate from Union Station to River Market primarily along Main Street.

**Alignment/Operations:** South of the downtown loop, service would operate in mixed-traffic, but with queue jump lanes at most signalized intersections to avoid delays. Within the Loop, service would operate in curbside exclusive bus lanes during peak periods and in mixed-traffic during off-peak periods. North of the Loop, service would operate in mixed-traffic with queue jump lanes at key intersections.

**Stations:** Station would be located at the same locations as with Main Street streetcar service (as described above).

**Service Levels:** Main Street enhanced bus service would operate every 10 to 20 minutes, seven days a week, in the same manner as Grand Boulevard streetcar or enhanced bus service. Note that this would be slightly more frequent than the 11- and 22-minute headways that would be associated with streetcar service on Main Street.

**Transit Priority:** As with enhanced bus service on Grand Boulevard, three types of transit priority would be used to speed service. These would include:

- Queue jump lanes at signalized intersections north and south of the Loop.
- Peak period exclusive bus lanes within the Loop.
- Transit signal priority at key intersections.

**Roadway and Parking Changes:** With enhanced bus service on Main Street, between Walnut Street and the Loop, the traffic configuration could be revised to two lanes in each direction with a middle left turn lane. The curb lanes could be used for parking and queue jump lanes on an all-day basis or only during off-peak periods. In areas where on-street parking is permitted, the development of queue jump lanes would eliminate some parking. Within the Loop, in most areas, the right-hand lanes would be used as dedicated bus lanes during peak periods, and for general traffic and/or parking during off-peak periods.

**Transit Integration:** The same local transit service changes would be made with enhanced bus service on Main Street as with streetcar service. As described above, the most significant change would be to shift Main Street MAX to Grand Boulevard.



## 4. Evaluation of the Alternatives

## 4.1 Evaluation Process Approach and Overview

### 4.1.1 Evaluation Methods

Consistent with FTA guidance, this *Kansas City Downtown Corridor Study* has followed a multi-step process to evaluate all reasonable service development options. In summary, this process consisted of:

- Identifying the range of potentially promising alignments (Tier 1 Alignments)
- Screening the Tier 1 alignments into a short-list of alignments and adding modal alternatives (Tier 2
   Alternatives) for more detailed evaluation
- Conducting a detailed evaluation of the Tier 2 Alternatives
- Selecting a LPA based on the results of the detailed evaluation

In Kansas City, all of the downtown corridor transit mode alternatives could operate within the existing roadways; therefore, any potential roadway alignment could be used by modern streetcar or any form of enhanced bus service. As a result, in order to expedite the screening process, the study used a process in which the Tier 1 screening focused on selecting a short-list of alignment alternatives. Once the preferred alignments were selected, the Tier 2 screening evaluated the different service alternatives – Build (streetcar), TSM (enhanced bus) and No Build – that would potentially operate along those alignments.

In both the Tier 1 and the Tier 2 screening and evaluation processes, the study alternatives were evaluated against the evaluation criteria that were developed based on the Goals and Objectives and the Purpose and Need Statement as defined in Chapter 2, and were organized around four themes and project goals, as follows:

- Connect: Enhance linkages in downtown Kansas City and improve local circulation
- **Develop:** Support local and regional economic development goals
- Thrive: Strengthen downtown districts and urban centers
- Sustain: Create an environment that will be sustainable over the long term

The Purpose and Need Statement lists a series of objectives under each project goal (see Chapter 2). These objectives, in turn, guided the development of the evaluation criteria that would be used in both the Tier 1 and Tier 2 evaluations. The evaluation criteria were developed to further define each objective and support evaluation of the alignments against the stated goals in a transparent and understandable manner. The evaluation criteria, grouped by study goal, are listed in Table 2-3.



<sup>&</sup>lt;sup>4</sup> Note that this process was recently accepted by FTA for the Providence Core Connector Study, which is examining the development of streetcar service in Providence, RI, and is very similar to this study.

## 4.1.2 Tier 1 Screening

As noted above, the downtown corridor transit service alternatives were developed to operate within existing roadways, and all potential alignments could be used by streetcar or any form of enhanced bus service. Therefore, the Tier 1 screening focused on identifying a list of promising alignments and then evaluating and narrowing the list to a short-list of alignments, rather than on combinations of alignments and modes.

As noted in Chapter 2 and presented in Table 2-3, the screening criteria included a wide variety of qualitative and quantitative measures that were examined at varying levels of detail. Each alignment was measured against the individual criterion in terms of in terms of relative ratings of "Best", "Good", and "Fair." The ratings reflected relative, rather than absolute, scores; consequently, alignment ratings can only be interpreted relative to the other alternatives. Additionally, because the alternatives are physically located close to each other, the differences between alternatives were often subtle. Consequently, in some cases, more than one alternative received a "Best" rating and in other cases, none of the alternatives received a "Best" rating. Likewise, when there were no discernible differences between alternatives, each alternative received the same rating.

### 4.1.3 Tier 2 Evaluation

Once the seven alignments were narrowed to two, the Tier 2 alternatives were developed. These alternatives included "Build", Transportation System Management (TSM), and "No-Build" alternatives. For this study, the Build alternatives consisted of streetcar service along each alignment; the TSM alternatives consisted of enhanced bus service along each alignment; and the No-Build alternative consisted of current services and currently programmed improvements.

Chapter 3 provides more a more detailed description of the Tier 2 Alternatives. The Tier 2 evaluation required that the Build and TSM alternatives be more fully developed in terms of:

- **Station Locations:** More specific station locations were determined using existing transit ridership and land-use data, together with typical stop spacing practices.
- Operating Plans and Costs: Conceptual operating scenarios were developed for how the downtown corridor service would operate on each of the candidate corridors by mode. Conceptual operating plans also supported other aspects of the evaluation process such as system operating costs, ridership and potential system benefits.
- Conceptual Engineering: The study team assessed how the downtown corridor could be developed in each of the candidate corridors and modes. The engineering and design assumptions were developed in sufficient detail to support accurate capital cost estimates, right-of-way requirements, and operating procedures and facility design. The engineering estimates were produced at a conceptual level in order to identify fatal flaw and order-of-magnitude impacts or benefits. Cost estimates were developed employing industry standard unit cost measurements.
- Capital Costs: The study team built on the conceptual engineering design analysis to create an
  estimate of the capital costs associated with development of each of the selected alternatives.
   Capital cost estimates were developed using quantities and technology definitions in accordance
  with the FTA standardized cost categories.



- Ridership, Transit System User Benefits and Cost Effectiveness: Using the station locations and conceptual operating plans, the study team developed ridership forecasts for each candidate corridor and operating mode. These ridership estimates were also used to determine transit system user benefits and cost-effectiveness measures.
- Transportation Impacts: The study team assessed how the potential alternatives would affect downtown traffic and transportation infrastructure, such as traffic circulation, parking, and bicycle and pedestrian systems.
- Utility Coordination: The study team assessed the unknowns and risks associated with subsurface utilities by looking for conflicts with existing utilities.
- **NEPA Compliance:** The team conducted evaluations to identify any significant potential impacts on the environment and historic resources
- **Funding Potential:** The study team identified potential funding strategies, and evaluated whether certain alternatives may be more easily fundable than others.

Consistent with the Tier 1 screening, the Tier 2 evaluation criteria reflected project goals and objectives, and included a combination of qualitative and quantitative evaluation criteria. In many cases, the Tier 2 evaluation criteria were the same or similar to the Tier 1 evaluation criteria, but in many cases, additional criteria were used (for example, ridership, operating and capital costs, cost-effectiveness, and impacts on natural and historic resources and the environment). In nearly all cases, the Tier 2 evaluation considered the criteria in more detailed than the Tier 1 screening. The Tier 2 evaluation criteria are also summarized in Table 2-3.

## 4.2 Tier 1 Screening Results<sup>5</sup>

The Tier 1 alignments were evaluated against 13 evaluation criteria, as shown in Table 2-3. Conducting the evaluation process required defining a number of assumptions. Among the most critical of these was determining the influence (or capture) area associated with each alignment. For the analysis, locations were considered to be directly served by the alternative if they were within a five-minute walk, or one-quarter mile from the transit alternative.

For the bi-directional alternatives, setting a ¼-mile walking buffer is straightforward and covered all areas within ¼ mile of the alignment. For the couplet alternatives, however, the influence area was defined as the area within a ¼ mile from both legs of the couplet. This assumption means that the walking distance to and from the couplets would be smaller than for the bi-directional alternatives. The reasoning behind this assumption is that both legs of the couplet must be within ¼ mile of the activity center to be considered within walking distance.

The one exception to the above ¼-mile assumption was for development impacts. In this case, the ¼-mile buffer was defined more broadly. Couplets operate on two parallel streets; instead of requiring both legs of the alignment to be within a ¼ buffer, based on the consensus of the Partnership team, the

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<sup>&</sup>lt;sup>5</sup> The Results of the Tier 1 Screening are detailed in the *Tier 1 Screening Results Technical Memorandum*, prepared by Nelson Nygaard in August 2011.

## Regional Alternatives Analysis:

influence area was defined as within ¼ of mile of each leg. As a result, the influence area for development impacts is larger. This reflects assumptions that development potential is not absolutely tied to walking distance, and being close to the alignment, even if it operates only in one direction, is sufficient to encourage development.

Note that for the Tier 1 screening, no buffer was used at the northern end of the alignments (the area around City Market) because the routings through that area had not yet been determined, and any of the "mainline" alignments could use multiple routes through the City Market area. On the southern end, the buffer was based on the end point of the alignment without any assumption regarding a potential spur along Pershing Road.

Overall, the seven alignments had different strengths and weaknesses, but each option offered potential as a viable downtown corridor. The most significant differences were in terms of improving transportation linkages, supporting existing activity centers and strengthening development potential; in these areas, Grand Boulevard and Main Street performed the best as shown in the summary analysis on Table 4–1.

Major findings from the Tier 1 Screening process include:

- Overall, bi-directional alignments scored higher than the couplets:
  - With service on two separate streets, couplets have less intuitive service design because riders
    would board and alight from the service in different locations. This service design also creates
    relatively confusing interfaces with bus services, especially with east-west connections operating
    on one-way streets. Consequently, the couplets are less effective at improving transportation
    options.
  - Walking distances to/from the couplet alternatives are shorter than those of some of the bidirectional options and thus these alignments were less accessible to/from Downtown Kansas City activity areas.
  - Because the couplet alignments affect two streets, they have increased impacts on utility systems.
  - Finally, results from initial stakeholder meetings and a public workshop suggested that the couplet alternatives are less attractive to stakeholders and members of the public.
- An important exception to the above would be the ability to support development and redevelopment. Because couplets operate on two streets, the alignments would influence a larger area in downtown Kansas City and thus have a greater potential to support development. Only the Main Street bi-directional alternative rated as strongly in terms of development and redevelopment potential.
- ◆ There would be little difference among the alignments in terms of increasing the number of residents in downtown Kansas City, thus none received a Best rating. This finding reflects the fact that downtown Kansas City is currently heavily oriented toward employment, with jobs outnumbering residents 10 to 1. Downtown corridor service could help support residential development; this criterion was evaluated more closely in the Tier 2 evaluation.



• Initial screening of the alternatives included the ability of the service to improve transit service to transit-dependent populations (i.e., low income or zero vehicle household, individuals with a disability, individuals aged 65+ or minority individuals). The analysis found that because the number of people living in the downtown corridor is small, the number of transit dependent individuals is likewise small. There was no difference among the alternatives, thus this screening criterion was not carried forward.

Additional detail on these findings is presented in the following sections.

## 4.2.1 Alignment 1: Grand Boulevard

Grand Boulevard was one of the two alternatives that received a greater number of "Best" ratings. Two of the "Best" ratings were associated with providing connections to downtown activity centers and access to employment and residential areas. While several of the alignments would offer access to many of downtown Kansas City's primary activity centers (Sprint Center, Power and Light District, Crown Center, Union Station, Convention Center), Grand Boulevard is the only alternative that would be directly accessible to/from the Government District, a major employment center. As a result, the Grand Boulevard alignment directly serves the greatest number of jobs. Grand Boulevard would also have fewer and less significant utility impacts. Finally, there are several surface parking lots along Grand Boulevard; thus, Grand Boulevard rated well in terms of offering potential to reduce the amount of surface parking.

## 4.2.2 Alignment 2: Main Street

Main Street received five Best ratings, primarily due to Main Street's strategic location in the center of downtown Kansas City, which makes it accessible to visitor and special event activities as well as most of downtown Kansas City's major activity centers. Main Street also rated well in terms of improving circulation in downtown, because it is located adjacent to the 10th and Main Transit Plaza, currently Kansas City's largest and most comfortable transfer location. In addition, Main Street also offers potential in terms of development and redevelopment impacts, and the alignment is a higher value corridor: thus new development also has potential to achieve high values. Finally, Main Street is the alignment most preferred by members of the public and stakeholders. Public comment largely echoes other findings associated with Main Street being in the heart of downtown Kansas City and equidistant from most major activities.

## 4.2.3 Alignment 3: Walnut Street

Walnut Street generally performed well, but lacked a compelling reason to keep the alignment under consideration. Its strengths were that it is well positioned in downtown Kansas City in terms of access to existing employment, activity centers, and visitor attractions. However, Walnut Street is not a primary commercial corridor and consequently, tends to provide "back door" rather than "front door" access to some of downtown's major buildings and attractions. In addition, because Walnut Street is not a primary commercial corridor, the development of new transit services on Walnut Street could potentially dilute rather than strengthen the existing transit network. It also has less compelling potential development impacts with fewer vacant parcels and fewer larger sized parcels.

## 4.2.4 Alignment 4: Baltimore Avenue

Baltimore Avenue, like Walnut Street, performed well in the Tier 1 screening criteria process overall, but without exceptional performance in any of the criteria. Baltimore Avenue's strengths included a fairly



strategic location in Kansas City with access to many of the downtown's activity centers, and visitor attractions. The corridor also offers a relatively better location with respect to existing residential development and, consequently the best potential to encourage future residential development.

However, a challenge associated with a Baltimore Avenue alignment is its distance from the Government District, the downtown's highest concentration of employment. Also, like Walnut Street, Baltimore Avenue is not a primary commercial corridor and tends to provide "back door" rather than "front door" access, and new transit services could potentially dilute rather than strengthen the existing transit network.

## 4.2.5 Alignment 5: Grand Boulevard and Walnut Street Couplet

The Grand Boulevard/Walnut Street couplet alignment produced mixed results in the Tier 1 screening. Both streets are well positioned, such that the couplet provides access to downtown employment and population, although less than the bi-directional option on Grand Boulevard. The Grand/Walnut couplet also ranked high in terms of potential to support development and reduce the amount of surface parking downtown. The high ranking largely reflects the couplet design, which encompasses a larger area that could be positively influenced for development through improved transportation infrastructure.

Most of the challenges associated with the Grand Boulevard and Walnut Street couplet alignment reflect challenges inherent to a couplet design. Operating service on two streets is a less intuitive service design (i.e. boarding on street and alighting on another). The impact of the service design would affect not only future corridor service, but also existing and future bus service. As a result, transit benefits would be relatively more diluted when compared with the other alignments. Couplets also have increased impacts on the utility system because they require construction and operations on two streets rather than one.

## 4.2.6 Alignment 6: Main Street and Walnut Street Couplet

A Main and Walnut Street couplet rated well in terms of access to/from downtown's major activity centers as well as several of the visitor and special event activities. Like the other couplets, the Main/Walnut alignment also offered stronger potential to support development and redevelopment because it would influence a larger area. The couplet also would have few issues with service reliability associated with street closures.

Consistent with other couplet designs, the Main/Walnut couplet creates a less intuitive service design; however, the Main/Walnut couplet would serve the 10th and Main Transit Plaza and thus would partially help strengthen the existing downtown transit resources (although to a lesser extent than the bi-directional alignment on Main Street). Lastly, couplets have increased impacts on the utility system because they require construction and operations on two streets rather than one.

## 4.2.7 Alignment 7: Main Street and Baltimore Avenue Couplet

The Main Street and Baltimore Avenue couplet alignment received a best rating for its ability to support development and redevelopment. This best rating reflected a larger influence area that includes a fairly large number of vacant parcels along the couplet corridors. The location of the couplet along Main Street and Baltimore Avenue also means that the alignment would be within walking distance of a large number of activity centers and visitor attractions.



## Regional Alternatives Analysis: Downtown Corridor

						Table 4	1–1: Tier 1	Screening	Summary	Matrix						
Alternative	C1. Downtown Circulation	C2. Activity Center Connections	C3. Bicycle & Pedestrian Connections	D1. Developme nt & Re- developmen t	D2. Downtown Residents	D3. New Catalyst Projects	T1. Residential & Employment Support	T2. Visitor & Special Events	T3. Public & Stakeholder Input	S1A. Transit Efficiency & Effectiveness	S1B. Reliable Service	S2. Surface Parking Reduction	S3. Utility Impacts	Best	Good	Fair
1 Grand	Good	Best	Good	Fair	Good	Fair	Best	Fair	Good	Good	Fair	Best	Best	4	5	4
2 Main	Best	Best	Good	Best	Good	Good	Good	Best	Best	Good	Good	Fair	Good	5	8	1
3 Walnut	Fair	Good	Good	Good	Good	Fair	Good	Good	Good	Fair	Fair	Good	Fair	0	8	5
4 Baltimore	Good	Good	Fair	Good	Good	Good	Good	Good	Good	Fair	Good	Good	Good	0	11	2
5 Grand/ Walnut	Fair	Fair	Good	Best	Good	Good	Good	Fair	Fair	Fair	Fair	Best	Fair	2	4	7
6 Main/ Walnut	Fair	Fair	Good	Best	Good	Good	Fair	Good	Fair	Fair	Fair	Good	Fair	1	5	7
7 Main/ Baltimore	Fair	Fair	Fair	Best	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair	1	6	6

Conclusions: Alternative 2 (Main Street) is the highest rated alignment after considering all objectives. It received the greatest number of "Best" ratings and a high number of "Good" ratings. This is mainly a result of Main Street's connections with downtown activity centers, special event venues, and transportation options, as well as its potential for development/redevelopment. Alternative 1 (Grand Boulevard) is second due to one fewer "Best" rating and a few more "Fair" ratings. Grand Boulevard has good connections to employment centers and other activity centers, and has the best pedestrian and bicycle environment, but it doesn't support visitor and special event activies as well as other alternatives. The reliability of transit service along Grand Boulevard also rates lower than other options. In general, the bi-directional alignments rate higher than the couplet ones, primarily due to the smaller service area that reduces the number of transit and activity center connections. Service would also be less intuitive with the couplet alignments, and interactions with the local bus service would have to be carefully considered.

**Notes:** Walking distance analyses for the couplet alignments considers the area that can be reached by both the northbound and southbound trips, while development impact analyses for the couplets considers the area that can be reached by either the northbound or southbound trips.





Some of the challenges associated with the Main/Baltimore couplet are associated with the less intuitive service design and the relative impact on the downtown transit network. As a result, as compared with other alternatives, especially the bi-directional ones, the Main/Baltimore couplet is less supportive of efficient and effective transportation options in downtown. Also, as mentioned, couplet alignments had more utility impacts as compared with bi-directional options due to operations on two streets.

### 4.3 Tier 2 Evaluation Results<sup>6</sup>

Building on the Tier 1 Screening of Alignments, the Tier 2 evaluation examined five alternatives which included a No Build Alternative and two modal technology alternatives (Enhanced Bus and Modern Streetcar) operating on the two Alignments that were forwarded from Tier 1 for further screening (Grand Boulevard and Main Street). The Tier 2 Alternatives are described in more detail in section 3.3 and include the following:

### No Build

Base Case/No-Build

### Build/Streetcar

- Grand Boulevard Streetcar Alternative
- Main Street Streetcar Alternative

### TSM/Enhanced Bus

- Grand Boulevard Enhanced Bus Alternative
- Main Street Enhanced Bus Alternative

The five alternatives were evaluated against the criteria described in Table **2-3** with results presented below in terms of the project's major themes: Connect, Develop, Thrive and Sustain.

# 4.3.1 CONNECT: Enhance Linkages in Downtown Kansas City and Improve Local Circulation

Enhancing transportation connections and improving local circulation is a key objective of the downtown corridor study. In the Tier 2 evaluation, the "Connect" goal was evaluated according to each alternative's ability to:

- Provide quality connections between existing downtown activity centers and connections to other transit resources
- Support pedestrian and bicycle travel



<sup>&</sup>lt;sup>6</sup> The results of the Tier 2 Screening Analysis are documented in more detail in the *Tier 2 Screening Analysis Technical Memorandum*, prepared by Nelson Nygaard in October 2011.



These criteria revealed no differences between modes, but a slight preference for operations on Main Street. While both alignments achieved nearly equal access to the activity centers, Main Street also provided connections to the 10th and Main Transit Plaza.

### 4.3.1.1 Connections Between Existing Downtown Activity Centers

Improving connections between existing downtown activity centers was evaluated according to the number of activity centers within a ¼-mile distance of the planned stations and the walking distance between the stations and the activity centers.

## 4.3.1.2 Number of Activity Centers Within a ¼-Mile Walking Distance

The downtown corridor is home to a large number of major activity centers, and ideally, a new downtown corridor transit system circulator would serve as many of these as possible. In terms of travel volumes, the most important activity centers include:

- River Market
- 3rd and Grand
- 10th and Main Transit Plaza
- Convention Center
- Kauffman Center for the Performing Arts
- Power and Light District
- Sprint Center
- Bolling Federal Building
- County Courthouse
- State Office Building
- City Hall
- Greyhound Station
- Freight House
- Union Station
- IRS Building
- Crown Center

Overall, both Grand Boulevard and Main Street would serve nearly all of these activity centers (see Table 4–2). Significant differences between the alignments would be:

- Grand Boulevard would directly serve the Sprint Center and would better serve the Government District.
- Main Street would directly serve KCATA's 10th and Main Transit Plaza, which is the most important transfer location in downtown, and would better serve the Convention Center and Kauffman Center for the Performing Arts.

Providing direct service to the 10th and Main Transit Plaza and better service to the Convention service is considered a reasonable trade-off for less convenient service to the Government District, and thus, for this criteria, the Main Street alignment was rated as preferable.



## 4.3.1.3 Walking Times to and from Activity Centers

As part of the Connect criteria, walking times were also considered. As with the number of activity centers served, walking time differences would be between alignments and not modes. Generally, activity centers on the western side of the study area would be better served by the Main Street alternatives and activity centers on the eastern side of the study area would be better served by the Grand Boulevard alternatives.

As with activity centers, the most significant difference between alternatives is that Main Street would directly serve the 10th and Main Transit Plaza and more special event and visitor activity at the Convention Center and the Kauffman Center for the Performing Arts, while Grand Boulevard would directly serve the Sprint Center and would offer better service to the Government District. (see Table 4–2). In both cases, each alignment directly serves six activity centers. Alternatives operating along Grand Boulevard are within a 10-minute walk from nine of the remaining 10 activity centers, while alternatives on Main Street are within a 10 minute walk of eight of the remaining 10 activity centers. As a result, when considering the walking times to and from the Activity Centers, there is no clear difference between the alternatives.

Table 4-2: Number of Activity Centers Served by Proposed Stations Associated with each Tier 2 Alternative

Station:	No Build	Enhanced Bus Grand	Streetcar Grand	Enhanced Bus Main	Streetcar Main
3 <sup>rd</sup> and Grand	n/a	2	2	2	2
River Market City Market	n/a	2	2	2	2
River Market West	n/a			1	1
North Loop	n/a	1	1	1	1
Financial District	n/a			1	1
Financial District South Govt District	n/a	4	4	4	4
Convention Ctr/P&L Sprint Ctr/P&L	n/a	5	5	3	3
Kauffman Ctr Crossroads North	n/a	2	2	3	3
Crossroads	n/a	0	0	1	1
Freighthouse Crossroads South	n/a	1	1	1	1
Crown Center	n/a	2	2	2	2
Union Station	n/a	4	3	3	3
Number of Activity Centers Served*:	n/a	12	11	10	10

<sup>\*</sup> Note: Columns do not sum to the total because station influence areas overlap.

Table 4–3: Walking Times to/from Major Activity Centers (in minutes)
From Stops Associated with the Tier 2 Alternatives

Nearest stop to:	No Build	Enhanced Bus Grand	Streetcar Grand	Enhanced Bus Main	Streetcar Main
River Market	n/a	directly served	directly served	directly served	directly served
3 <sup>rd</sup> & Grand	n/a	directly served	directly served	directly served	directly served
10th & Main Transit Center	n/a	4	4	directly served	directly served
Convention Center	n/a	6	6	3	3
Kauffman Center	n/a	8	8	5	5
Power and Light	n/a	directly served	directly served	directly served	directly served
Sprint Center	n/a	directly served	directly served	3	3
Bolling Federal Building	n/a	5	5	9	9
County Courthouse	n/a	4	4	8	8
State Office Building	n/a	6	6	11	11
City Hall	n/a	3	3	6	6
Greyhound Station	n/a	13	13	16	16
Freight House	n/a	6	6	3	3
Union Station	n/a	directly served	2	directly served	directly served
IRS Building	n/a	4	5	6	6
Crown Center	n/a	directly served	directly served	directly served	directly served

## 4.3.1.4 Improve Pedestrian and Bicycle Environment

## Walking Environment

The walking environment was evaluated by using the five pedestrian level of service (LOS) measures developed as part of the Kansas City Walkability Plan. The LOS measures were subsequently evaluated according to five sub-segments, or districts, within each corridor: Union Station/Crown Center; Crossroads Arts District; Power & Light District; Financial District/North Loop and River Market. The results of this evaluation suggest that the walking environment to and from all alternatives would generally be good, and there is no significant difference between Grand Boulevard and Main Street alternatives:

- <u>Directness</u> The directness of the pedestrian network in each district on each corridor was rated as
  good because each area has a grid network within one-quarter mile of the proposed corridors and
  transit stations.
- Continuity Both corridors feature a complete sidewalk system along the proposed routes, with only a few minor sidewalk gaps in the system, which are nearly always off the corridors on side streets. For this reason, both corridors generally received good ratings, although some subsegments received a lesser rating of fair. On both corridors, the Crossroads Arts District has more maintenance issues with cracked, broken, and overgrown sidewalks compared to other districts. The maintenance issues, as well as more numerous ADA issues in this district, led to a rating of fair. The one rating that differed in this category between the two corridors was within the Financial



District/North Loop. This district rated Main Street as good, but rated Grand Boulevard as fair due to more numerous ADA and maintenance issues.

- <u>Street Crossings</u> Street crossings along each corridor were generally rated as fair. The widths and crossings distances along the two corridors are similar, although Main Street is slightly narrower through much of its length. Both corridors provide similar pedestrian features, including marked crosswalks, countdown pedestrian signals, and curb ramps. Street crossings were assessed as fair in most districts because while features are provided to help pedestrians cross the street, there is room for improvement in many locations. The district with the most complete street crossings is the Power & Light District. The Crossroads Arts District along the Grand Boulevard corridor received a rating of poor because there are two signalized intersections without pedestrian signals and more curb ramp issues. This compares with Main Street corridor, which was rated fair.
- Visual Interest and Amenities Although the aesthetic appearance of the pedestrian facilities along the two corridors are generally rated as fair, the ratings within the various districts range from good in the Union Station/Crown Center, Power & Light, and River Market Districts, to fair in the Financial District/North Loop, to poor in the Crossroads Arts District. Both corridors provide similar levels of lighting, landscaping, and maintenance, and no rating distinction was judged between the two corridors in each district.
- <u>Security</u> Security along the two corridors was generally judged to be good, based on available lighting, and generally unobstructed lines of sight. Further, on-street parking provides sufficient separation from traffic. Again, no distinction was observed for this category between the Main and Grand corridors for each of the districts.

## **Bicycling Environment**

The bicycling environment was evaluated based on the overall roadway conditions for cyclists and the availability of bicycle parking. Bicycling conditions to and from all alternatives would also be similar:

- Bicycling Conditions The current bicycling environments along the two corridors are very similar, both in terms of the traffic and roadway characteristics. No designated or exclusive bicycle facilities are currently available on either corridor or any of the cross-streets. Although the current configurations of the two corridors would likely only attract experienced, confident cyclists, the current environment is fair for bicycling. The multi-lane configurations in particular make it easier for motorists to pass cyclists, even those that are controlling a lane. Due to the similarities of conditions and characteristics on the two corridors, no distinction can be made between the bicycling environment and connections along the two corridors.
- <u>Bicycle Parking Facilities</u> The supply and quality of existing bicycle parking is a considered a good indicator of the overall bicycle friendliness of the corridor. Unfortunately, bicycle parking facilities are generally sparse to non-existent along much of the two corridors, and neither corridor was clearly better than the other in any of the districts. As such, the overall rating for both corridors is poor, although the districts within the loop were marginally better at a rating of fair.

## 4.3.2 DEVELOP: Support Local and Regional Economic Development Goals

For the Develop category, the Tier 2 evaluation considered the ability of each alternative to support five major criteria:





- Existing conditions and current growth trends
- Capacity for future growth
- Economic development potential
- Comparison of maximum projected increases in market value in next 15 years
- Qualitative assessment of downtown real estate market and economic development potential

A critical baseline factor assumed in the economic development evaluation is the notion that streetcar service offers significantly more potential to attract and stimulate development as compared with enhanced bus or a no build scenario. This assumption reflects national experience with other services, which demonstrate that enhanced bus (or bus rapid transit) have not generated the same kind of economic development that streetcar or fixed-guideway transit has achieved. This experience has persisted even when enhanced bus was developed with a dedicated bus lane and significant investment in technology. In the case of streetcar or fixed-guideway systems, the evidence from cities such as Portland (Oregon), Seattle and Tacoma (Washington) and Little Rock (Arkansas) show there is a clear documented increase in development and property values surrounding the service. As a result, the analysis of economic development potential focuses on the corridors, rather than modes, based on the assumption that the No Build and TSM (Enhanced Bus) alternatives would not generate substantial economic development impacts over the base case.

A factor that distinguishes the Tier 2 analysis from the work done in the Tier 1 screening is the distinction between conditions at varying distances from the alignment. Whereas the Tier 1 analysis assumed a ½ buffer around the alignments, the Tier 2 economic development evaluation based its evaluation on three different zones: the area directly on the alignment and within one block of the corridor, the area within two blocks of the corridor and the area within three blocks. These areas are shown on Figure 4-1. A streetcar is likely to have a larger impact on the parcels that are directly on the alignment than the parcels farther away. These influence area attempt to capture the varying levels of influence.

Entire Study Area

West String St.

A form (strong)

Figure 4-1: Economic Assessment Analysis Areas





Evaluation of these criteria shows a strong preference for streetcar over enhanced bus, and a preference for Main Street over Grand Boulevard. Main Street's stronger showing reflects higher recent growth rates and higher corridor values.

### 4.3.2.1 Existing Conditions and Current Growth Trends

Methods used to assess existing conditions and growth trends included examining the existing zoning; reviewing existing activity; and evaluating growth trends associated with population, employment and housing.

▶ Existing Zoning - Zoning for the two corridors is the same. Both alignments serve four main areas within the downtown: River Market, the downtown loop, Crossroads, and the Crown Center/Union Station area; each of these four areas is currently zoned for mixed use. In addition, the downtown loop and Crown Center area being zoned as "Downtown Core" and the River Market and Crossroads are being zoned as "Downtown Mixed-Use." The "Downtown Core" zoning definition is intended to promote high-intensity office and employment growth, recognizing that the area is a hub for businesses, communications, retail, cultural, visitor accommodations, and entertainment uses while also accommodating residential development. "Downtown Mixed-Use" zoning is intended to



accommodate a large variety of uses from office to institutional to residential, while promoting a mix of land uses.

Existing Activity and Growth Trends – The Main Street alignment would serve more of the existing residential population and economic activity centers than the Grand Boulevard alignment would. As shown in Table 4–4, Main Street exceeds Grand Boulevard by 10% or more in many of the key past-and present-day variables (i.e. population and employment), whereas Grand Boulevard outperforms Main Street by 10% or more for only one of the key variables: non-residential commercial space growth over the past ten years.

Table 4–4: Comparisons of Existing Conditions and Current Growth Trends

	Study Area(1)	Main Street (1)	Grand Blvd. (1)	Preference to: (2)		
				Main	Grand	
Existing Conditions: 2010						
Population (Census 2010)	4,609	4,596	3,628	1	(	
Within 2 blocks		3,130	2,216			
Housing Units (Census 2010)	3,880	3,867	3,061	1	(	
Within 2 blocks		2,663	1,804			
Employees (TAZ 2005)	65,602	52,320	50,056	0	0	
Within 2 blocks		27,220	25,880			
Hotel Rooms		3,474	2,469	1	C	
Within 2 blocks		2,469	1,460			
Venues - Annual Attendance	5.7 million	5.7 million	3.3 million	1	C	
Number	14	14	11			
Retail Sales (within 1 block)		\$93 million	\$97 million	0	C	
Eating and Drinking Only		29 million	29 million			
Market Value	\$1880 million	\$1590 million	\$1570 million	0	C	
Within 1 block		490 million	390 million			
Within 2 blocks		890 million	770 million			
Growth Trends: 2000 - 2010						
Population Growth (from Census)	3,017	3,123	2,737	1	C	
Per year	302	312	274			
Housing Units (Census 2010)	2,513	2,513	2,174			
(Project List)	3,200	3,200	2,369	1	C	
Per year	251 to 320	251 to 320	217 to 237			
Non Residential Growth (sf) (Project List)	1,467,207	1,281,752	1,467,207	0	1	
Per year	146,721	128, 175	146,721			
Growth Projections (TAZ 2005-2040)						
Employment	32,369	30,784	31,380	0	C	
Per year	925	880	897			
Households	6,263	5,935	4,851	1	(	
Per year	179	170	139			
Number of Times Line is Better by 10% or More based on the Variable (1)				7	1	
Notes: (1) Study area as shown on Figure 4-1						
(2) Compares the variable being measured between the two lines. If one line	exceeds the other h	v 10% or more it	ets a 1. otherwis	e a O Sums	all the	

(2) Compares the variable being measured between the two lines. If one line exceeds the other by 10% or more it gets a 1; otherwise a 0. Sums all the Ones at bottom of page.

With respect to growth trends, Main Street might be the better choice in the event that the presence of transit (whether BRT or streetcar) does not result in a shift in future growth patterns

within the downtown area in general. This is because, over the past ten years, total added residential development in the Main Street alignment has exceeded development added in the Grand Boulevard influence area by 35%. This significantly outweighs the amount of added non-residential commercial development, which, while favoring Grand Boulevard by 15%, accounts for a much smaller incremental addition of square footage and value, less than half of the residential base total.

• Consequently, from the perspective of these criteria, although the zoning does not favor one alternative or another, existing conditions and growth trends suggest the Main Streetcar Alternative would support more development and redevelopment.

## 4.3.2.2 Projections of Medium Term Capacity for Growth

Both alignments were examined to understand the potential for future development and to see if potential development along either alignment would be greater than capacity limits in the near future. Two types of sites were considered: vacant or underutilized sites, which includes parcels with no building, a very small building on a large parcel; and/or vacant buildings.

Using very conservative calculations<sup>8</sup>, both alignments offer very similar capacity for future development (see Table 4–5) – approximately triple current residential capacity and a more than 50 percent increase in non-residential capacity.<sup>9</sup> The most aggressive absorption scenario imaginable is a doubling of the annual rate of residential building along a given corridor relative to growth in the past ten years. Even under these conditions, there is enough available capacity to last at least thirteen years at the current, relatively modest, build-out densities. Long before this capacity constraint were to be reached, developers would build at an increased density that still meets the zoning regulations. This would significantly extend the build-out life of the given corridor. Additionally, the zoning for the areas along the alignments is for mixed use, so sites that would otherwise be assumed to be allocated for one use could be used for another use. Given these conditions, neither alignment seems to suggest any particular advantage from the build out capacity viewpoint.



<sup>&</sup>lt;sup>7</sup> Use of various economic incentives and development tools (such as public sites and tax increment financing, Historic and Low Income Tax Credits, tax abatement, etc.) have been major factors in influencing the level and location of downtown development over the past decade. The "highest" end projections assume that these tools would continue to be available.

<sup>&</sup>lt;sup>8</sup> In calculating "medium term" build out capacity (i.e. next 15 to 30+/years) it is assumed that some percentage of parcels potentially available for development (e.g. vacant or underutilized lots) will not, in fact be available over that time period, due to any number of factors such as existing legal agreements, size, use, etc. In addition, when significant unused capacity exists (as it will in early years at least) and the market is soft, many parcels can be expected to build out at substantially less than their theoretical legally allowed zoning capacity, due to the lesser cost of stick construction and use of surface parking or simple decks in a low-land-value scenario (relative to incremental construction costs for the more dense construction). As parcels begin to build out, prices rise, more parcels come on the market, and build-out tends to occur at higher densities, extending the time period until true build-out is actually approached. In fact, in very few US downtowns is true build-out ever reached.

Table 4-5: Projection of Medium Term Development Capacity of Streetcar Alternatives

	Main	Street	Grand Blvd.		
	Residential (Units)	Non-Res (SF)	Residential (Units)	Non-Res (SF)	
Development Capacity- "Medium Term"	8,474	6,561,368	8,451	6,297,955	
"Baseline" Capture Rates: (annual	320	128,175	240	146,721	
Moderate:					
Average Annual Absorption	384	134,584	288	154,057	
Years to Absorb:	22	49	29	41	
High:					
Average Annual Absorption	640	166,628	480	190,737	
Years to Absorb:	13	39	18	33	

a. **Moderate** = residential development that is equal to 120% of average per year of last 10 years in the corridor; and employment that is 105% of that average.

## 4.3.2.3 Projection of Upside Economic Development Potential Over First 15 Years

The Tier 2 evaluation also considered the economic development potential associated with each alternative and alignment. The estimated potential shown (see Table 4–6) compares the <u>maximum</u> likely "add" to total market value (in 2010 uninflated dollars) of all non-governmental and non-institutional property within each of the two alignments over the 15 years after a streetcar is fully funded and commences construction. In this case, only the streetcar is considered because, as discussed, there is no statistical, or justifiable anecdotal evidence, that BRT significantly accelerates property development or property values in the corridors or locations with which it might be associated.

Table 4–6: Comparison of Maximum Projected Increases in Market Value in Next 15 Years for Streetcar Alternatives; not BRT

	Study Area	Main Street	Grand Ave
Existing Conditions: 2010			
Market Value	\$1880 million	\$1590 million	\$1570 million
Economic Development Potential (Calculated)			
Maximum Upside Value Added Projection: (15 Years) (1)			
Value Added by Baseline Growth		\$769 million	\$690 million
Value Added by Streetcar Induced Growth and Premium at 3% on 1st 2 blocks		\$593 million	\$482 million
Total Value Added in 15 Years		\$1362 million	\$1172 million
Notes:			

(1) Estimate of maximum potential upside results under extremely favorable assumptions: first, that annual baseline economic growth over next 15 years equals the average achieved in the past decade - so "baseline growth" applies past annual absorption rates to housing at \$100,000/unit and non residential at \$150/sf. added to the existing market base (net increase over existing land values). Second, maximum growth induced by streetcar (within the streetcar influence zone) is the "high" absorption scenario increment shown in Table 4-5 times the unit prices; plus a one time average 3% assumed increase in the market value of all property within 2 blocks of the streetcar line.



b. **High** = residential development that is equal to 200% of average per year of last 10 years in the corridor; and employment that is 130% of that average. This number is quite aggressive and should assume the continuance of many of the existing economic development incentives and tools, at least in the first 5 + years until the trend proves itself.

The **streetcar maximum "value" added scenario** would include the sum of value added by continuation of existing "baseline growth" (the annual rate of development over the past ten years), plus the maximum assumed additional growth projected to be induced by streetcar in the given corridor, plus a one-time three percent increase in the value of all property in the given corridor. The increase in property value would be due to the addition of the transportation investment and proximity benefits of the streetcar, as seen in comparison cities, and would typically be realized over approximately three to seven years after the commencement of construction on the line. Applying the highest projected growth assumptions equally to each corridor, a streetcar could potentially add up to \$110 million more in value and development in the Main Street corridor than in the Grand Boulevard corridor, as shown in Table 4–6. The amounts projected to be induced by streetcar range from a 70% addition over and above baseline development in Grand Boulevard corridor to a 77% addition over baseline growth in the Main Street Corridor.

### 4.3.2.4 Qualitative Factors

A series of interviews were conducted with downtown real-estate and economic-development stakeholders. These stakeholders are from public, quasi-public and private entities and are active in the downtown real-estate development market. The purpose of the interviews was to gain a better understanding of the primary market dynamics within the downtown area, and to discuss how enhanced transit might factor into the equation. While the stakeholders provided various insights, a few key points were made by most or all of the interviewees. These key points are briefly summarized below according to three main categories. It is important to note that the summary below is a compendium of opinions of those interviewed and may or may not be consistent with the overall findings of this report.

### A. The performance and outlook for various market sectors within downtown:

- 1) Residential development has increased significantly in downtown over the past decade. Adaptive re-use of existing buildings has accounted for most of this development and nearly all projects have received some sort of subsidy, most notably through the use of historic preservation tax credits. Development has occurred primarily in the central and western corridors. While the for sale (condominium) market has largely disappeared, there remains some demand for rental residential units. Tight credit markets are making it difficult for new projects to meet this demand.
- 2) The downtown office market is very challenging. Vacancy rates are high and it will be several years before this supply is absorbed. Consequently, downtown rents are being driven low by the competition for a very limited pool of tenants. Additionally, competition with suburban markets, particularly those in Kansas where significant state incentives are being offered, is drawing office users away from downtown. Kansas City, MO has not been able to match the incentives offered in Kansas. With the possible exception of the occasional single-tenant, build-to-suit project, new office development in downtown is highly unlikely in the near term.
- 3) Retail and entertainment uses have significantly increased in the downtown area. The Power and Light District and Sprint Center are the major components of this trend. These projects and other smaller projects have changed the perception of downtown and made it more of a destination. Despite some success with these developments, an additional downtown population base is needed to add additional and more varied retail.



- 4) The downtown <a href="https://example.com/hotel">hotel</a> market is also struggling with high room vacancy rates. This is in part due to national economic conditions limiting travel, but also due to a major decrease in conventions within downtown over the past decade. Additional hotel rooms would be needed to compete for more conventions, but the existing struggles and tight credit markets make this a difficult proposition.
- 5) The cost of providing <u>parking</u> (generally structured) negatively affects the feasibility of projects downtown.

#### B. The potential role of enhanced transit such as streetcar in the downtown market:

- 1) Streetcar service would make residential development more attractive, but would not significantly reduce the level of subsidy required for new projects.
- 2) Similarly, retail uses could benefit from the increased mobility offered by streetcar, but it does not seem that streetcar itself would significantly increase the level of retail development. More residents are needed downtown for more retail.
- 3) Streetcar service is not likely to have a significant effect on the office market.
- 4) Streetcar service could potentially benefit the visitor/entertainment/hotel market the most, but it is unclear if it would be enough to significantly improve the level of activity in these sectors.

#### C. The relative merit of the Main Street and Grand Boulevard alignments:

- 1) In general, the interviewees believed that either alignment could work, that both were attractive options and that the overall differences between the two potential alignments were slight.
- 2) Nonetheless, there was a general perception that Main Street had more overall support and was the slightly better option.
- 3) More specific comments that were commonly mentioned:
  - a) The Main Street alignment was seen as having significant development momentum already and therefore some believed the project would have a stronger positive impact along Grand Boulevard.
  - b) Grand Boulevard could present the easier option from a constructability and cost perspective due to its greater width.
  - c) The Grand Boulevard line was seen as problematic due to:
    - i. Opposition by the Cordish Group to the project going by their front door
    - ii. Complications with the need to close Grand Boulevard for various major events throughout the year.
    - iii. The greater distance from the convention center and hotels along Wyandotte Street.
  - d) Grand Boulevard was seen as presenting more development sites within the Loop while Main presented more opportunities in other areas along the alignment.



## 4.3.3 THRIVE: Strengthen Downtown Districts and Urban Centers

This objective aims to support existing residential and employment centers as well as support visitor and special event activities using the following three criteria:

- Connections with existing residential and employment centers
- Support for visitor and special event activities
- Public and stakeholder support and/or opposition

In most categories, in terms of alignment, there was either little difference between Grand Boulevard or Main Street or Main Street performed better, and in terms of mode, streetcar would perform better than enhanced bus.

### 4.3.3.1 Support Existing Residential and Employment Centers

To understand each alternative's ability to support residential and employment centers, the alternatives were evaluated based on the number of people who live and work within ¼ mile of one or more of the proposed stations. The alternatives compare very similarly; however, there are some differences between the modes and alignments (see Table 4–7 and Figure 4-2). The difference between modes is an increase in the population served by the Enhanced Bus on Grand Boulevard Alternative. This increase is a function of how the bus would be routed through Union Station at the southern end of the alignment—by circulating through Union Station, the bus is accessible by the residential neighborhoods in the Freight House district.

The differences between Grand Boulevard and Main Street are consistent with previous analyses: Grand Boulevard serves more employment but less population and fewer households. This finding reflects the fact that Grand Boulevard is closer to the Government District and Main Street serves the population clusters on the western side of the study area. In summary, the alternative with the greatest potential is Grand Boulevard Enhanced Bus.

Table 4–7: Population and Employment Within ¼ mile of Tier 2 Alternative Stations

Population and Employment within ¼ Mile of Stations	No Build	Enhanced Bus Grand	Streetcar Grand	Enhanced Bus Main	Streetcar Main
Employees	n/a	50,853	50,853	47,150	47,150
Population	n/a	4,063	3,720	4,405	4,405
Households	n/a	2,907	2,677	3,211	3,211

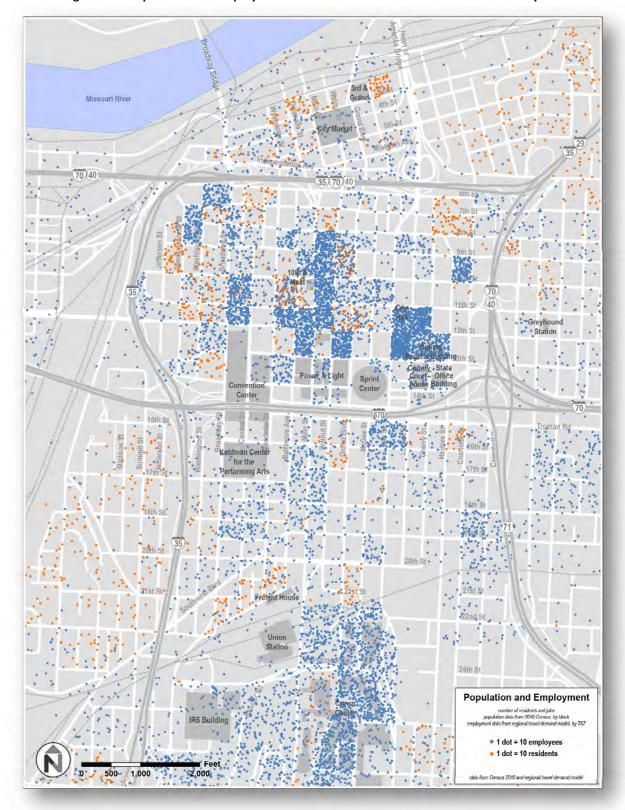


Figure 4-2: Population and Employment Distribution in the Downtown Corridor Study Area



## 4.3.3.2 Support Visitor and Special Event Activities

Tourism and business visitor activity comprises an important part of the downtown corridor's economy, thus the ability of a new transit circulator to support travel to and from hotels and special event venues is an important evaluation criteria. The evaluation process considered the accessibility of each alternative to hotels, hotel rooms, and special event venues; attendance at those venues shows there is no difference between modes, but there is a difference between alignments (see Table 4–8). Most of the differences between alignments results from Main Street's proximity to the Convention Center and related hotels as well as the Kaufman Center for Performing Arts. Consequently, even though the Sprint Center is situated on Grand Boulevard, the Grand alignment is not within a ¼ mile of several hotels and special event venues, thus the two Main Street alternatives (bus and streetcar) outperform the No Build and Grand Boulevard alternatives.

Table 4–8:	Activity	Levels b	y Tier 2 A	lternative
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Activity Levels	No Build	Enhanced Bus Grand	Streetcar Grand	Enhanced Bus Main	Streetcar Main
Major Hotels	n/a	6	6	8	8
Hotel Rooms	n/a	2,469	2,469	3,474	3,474
Special Event Venues	n/a	4	4	6	6
Annual Attendance <sup>1</sup>	n/a	3.3 million	3.3 million	5.7 million	5.7 million

<sup>&</sup>lt;sup>1</sup> The annual attendance figures consider a wider range of venues than just those considered special event venues in order to get a better comparison between the alternatives.

## 4.3.3.3 Public and Stakeholder Input

Prior to September 2011, two public open houses had been held to discuss the Corridor Alternatives Analysis. The first was held on June 21, 2011 and comments received as part of that meeting were incorporated into the Tier 1 screening process. The second, a public open house and "Streetcar Party", was held on August 31, 2011. The open house provided information about the AA process, Tier 1 screening process and ongoing work being conducted as part of the Tier 2 evaluation. The Streetcar Party offered members of the public a "sneak peak" of physical examples of the type of the streetcar and bus alternatives under consideration. Both a Kinkisharyo ameriTRAM and MAX bus were on display for members of the public to tour and view.

Comments received as part of the August open house and Streetcar Party form the basis of the Public and Stakeholder Input show the following major themes:

- There was overwhelming support for Streetcar over Enhanced Bus
- Most liked the simplicity of both the alignments
- Development stakeholders feel short-term market consisted of residents, downtown visitors and guests, and that Main Street would better serve those populations
- Main Street received more numerous and vocal support
- Grand Boulevard received significant opposition from some key stakeholders, largely with the respect to potential impacts due to Grand Boulevard street closures for special events.

As measured against the public and stakeholder input criteria, the Main Street Streetcar was preferred.



# 4.3.4 SUSTAIN: Create an Environment that will be Sustainable over the Long Term

This goal aims to create a transit corridor that will become a vibrant, active area. Accordingly, the study team evaluated each alternative based on the following objectives:

- Potential to improve the effectiveness and efficiency of existing transit service as measured by ridership, operating and capital costs, user benefits and cost effectiveness
- Transit reliability
- Impact on structure and surface parking
- Impacts on utility systems
- The potential to attract diverse set of private and public sector funding
- Impacts on natural and historic resources

There are several critical criteria evaluated under this goal, some of which favor Main Street Streetcar (ridership and transit reliability), some of which favor Grand Boulevard (utility impacts) and one that favors enhanced bus (capital costs). Considering all criteria together produces a preference for the Main Street streetcar.

# 4.3.4.1 Potential to Improve the Effectiveness and Efficiency of Existing Transit Service

### Ridership

Understanding the number of riders each of the alternatives would attract was an essential evaluation criteria. Ridership estimates were also used to understand user benefits and system cost-effectiveness.

Transit ridership for a given route depends on various factors including socio-economic characteristics, site conditions, transit supply variables, stop locations, etc. For this project, a sketch-level direct-demand model was developed that used multivariate regression analysis based on existing ridership data obtained from KCATA and socioeconomic data extracted from the Mid-America Regional Council (MARC) regional travel demand model. Peer system ridership characteristics and fixed guideway credits associated with unmeasured variables were also utilized to develop mode-specific coefficients. Figure 4-3 shows the overall model development and application process. The resulting model then predicted ridership as a function of population, employment, and hotel-motel rooms within a quarter mile of the project alignment.

Ridership projections for both 2015 (opening year) and 2035 (forecast year) indicate that ridership for the streetcar alternatives would be significantly higher than enhanced bus ridership, and that Main Street would generate higher ridership than Grand Boulevard (see Table 4–9). These findings are consistent across scenarios that were developed to reflect different assumptions about land use and economic activity. In the opening year (2015), the ridership forecasts show the streetcar would attract more than twice as many riders as the Enhanced Bus service; this trend continues to 2035. Among the two streetcar alternatives, the Main Street Streetcar is expected to carry 9% more riders in than opening year and 10% more in the forecast year as compared with the Grand Boulevard alternative.



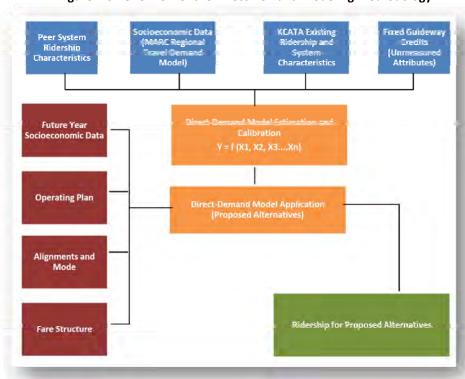


Figure 4-3: Overview of the Direct Demand Modeling Methodology

The ridership forecasts are considered conservative because event-related ridership was not adequately captured in this analysis. While the service design parameters assumed that the proposed transit services would serve a large event-related market, this market was not estimated due to the lack of readily available data. Several private charter and shuttle buses currently serve the event patrons traveling between hotels and venues, and ridership could be substantially higher depending on how these event related transit services are reconfigured with the project in place.

Table 4-9: Opening Year (2015) and Horizon Year (2035) Daily Ridership for Tier 2 Alternatives

Daily Ridership:	No Build	Enhanced Bus Grand	Streetcar Grand	Enhanced Bus Main	Streetcar Main
Opening Year (2015)	n/a	1,183	2,662	1,287	2,896
Forecast Year (2035)	n/a	2,465	5,547	2,677	6,023
Scenario Analysis <sup>1</sup>					
Moderate Growth	n/a	2,442	5,655	2,681	6,220
High Growth	n/a	_	6,271		6,928

Economic activity scenarios reflect assumed growth in economic activity resulting from implementation of the new transit system. Thus, the streetcar alternatives will experience additional growth in ridership due to the assumed impact of the streetcar on development patterns.

## 4.3.4.2 Annual Operating Costs

Operating costs for downtown corridor services would be related to the mode of service operated and the amount of service provided. At any given level of service, streetcar service is inherently more expensive to operate than bus service, largely due to higher infrastructure (tracks and power system)



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and vehicle maintenance costs. However, in many cases, because streetcars have higher capacities and shorter dwell times than buses, less service is required, and this can offset the higher unit operating costs.

At the present time, only three other cities (Portland, Seattle, and Tacoma) operate modern streetcar service, with costs per revenue vehicle hour (RVH) ranging from \$175 to \$386. These costs are 43% to 128% higher than for regular bus service. In cities that operate historic streetcars, streetcar costs are generally 35% to 50% higher than for regular bus service. With the exception of Tacoma, these differentials are similar as for modern streetcar service.

KCATA's operating cost structure is significantly lower than those in Portland, Seattle, and Tacoma. In 2009, KCATA had operating costs of \$104 per revenue vehicle hour. This compares to 2009/2010 bus operating costs in Portland, Seattle, and Tacoma of \$123, \$146, and \$169. With KCATA's lower operating cost structure, the cost of Kansas City streetcar service would also be lower, and based on the streetcar/bus differentials in Portland and Seattle, the expected 2009 costs would be approximately \$150 per revenue vehicle hour. Assuming 3.5% inflation per year, expected operating costs in 2015, which is when service would be projected to begin, would be \$184 per revenue vehicle hour. Enhanced bus operating costs would be similar to KCATA's current costs for MAX service, which would be approximately \$127 per revenue vehicle hour in 2015.

Streetcar service could be provided with three vehicles, whereas enhanced bus service would require four vehicles. This would be because longer bus dwell times, largely for wheelchair boardings and alightings and the loading of and unloading of bicycles with front-mounted bike racks) would increase running times to the extent that 10 minute (or 11 minute) service would require four buses.

On this basis, 2015 operating costs for either streetcar alternative would be \$3.19 million per year (see Table 4–10), versus \$2.95 million per year for the two enhanced bus alternatives. The differential would be relatively low, because as described above, four buses would be in service at most times for Enhanced Bus service, versus three streetcars for streetcar service.

Table 4-10: Operating Assumptions and Cost Estimates for Tier 2 Alternatives

	No Build	Enhanced Bus Grand	Streetcar Grand	Enhanced Bus Main	Streetcar Main
Service Frequencies					
Monday-Thursday					
6 AM - 9 PM	n/a	10	10	10	11
9 PM - 12 AM	n/a	20	20	20	22
Friday and Saturday					
6 AM - 2 AM	n/a	10	10	10	11
Sundays					
8 AM - 9 PM	n/a	20	20	20	22
Peak Vehicle Requirement	n/a	4	3	4	3
Vehicle Service Hours					
Monday-Thursday	n/a	66	50	66	50
Friday and Saturday	n/a	80	60	80	60
Sunday	n/a	26	20	26	20
Annual	n/a	23,160	17,370	23,160	17,370
Annual Operating Costs					
2011	n/a	\$2,572,202	\$2,777,978	\$2,572,202	\$2,777,978
Unit Costs (OC/RVH) <sup>1</sup>		\$111	\$160	\$111	\$160
2015	n/a	\$2,951,661	\$3,187,793	\$2,951,661	\$3,187,793
Unit Costs (OC/RVH) <sup>1</sup>		\$127	\$184	\$127	\$184

<sup>1</sup> Operating Costs (OC) per Revenue Vehicle Hours (RVH) (RVH = Vehicle Service Hours)

#### 4.3.4.3 Capital Costs

Capital cost estimates were developed at a level of detail necessary to accurately compare alternatives and establish a baseline project budget. Broadly speaking, this means that the estimates reflect a conceptual level of engineering and technical evaluation of the potential alignments. The analysis also considers historic streetcar project costs on similar type projects. These costs were adjusted, as necessary, to be relative to the bidding market in Kansas City versus the source project (primarily Portland, the most recent streetcar project constructed). The estimates include quantifiable items with unit costs as well as allowances for anticipated items that do not have sufficient detail to quantify at this time. The estimates include all projects costs including construction, right of way, vehicles, professional services (soft costs), allocated and unallocated contingencies and inflation. Combined, these project costs make up the total project cost as viewed by FTA and are established using the FTA Standard Cost Categories (SCC) workbook.

Not surprisingly, streetcar service would be significantly more expensive than Enhanced Bus, at \$101 to \$102 million versus \$18 to \$20 million (in 2015 dollars) (see Table 4–11). The large difference in costs would be largely attributable to costs for tracks, the power supply system, and vehicles.

Among the enhanced bus alternatives, Grand Boulevard is projected to cost approximately \$2.7 million less in capital costs than Main Street. The difference is due to numerous factors, the most significant being the greater number of stops and amount of site work along Main Street. The Grand Boulevard alignment would have 19 stops total (9 one-way stops in each direction and one bi-directional stop at



Union Station), while the Main Street alignment would have 12 one-way stops in each direction, for a total of 24 stops. This difference would increase construction costs by about \$725,000, and the costs of the fare collection system by about \$414,000. The Main Street alternative would also require greater allowances for pedestrian improvements, streetscaping, and roadway improvements since there are more intersections along Main Street. Greater allowances were also made along Main Street for modifying existing traffic signals, installing new pedestrian traffic signals, and allowing for signal priority as well.

The capital costs for the streetcar would be \$101 million for the Main Street alternative and \$102 million for the Grand Boulevard alternative. The Main Street alignment is slightly longer; therefore, the alternative would incur additional costs associated with more track; the alignment assumptions also include extra stops. However, the Grand Boulevard alternative would require additional systems development, and the final analysis shows both alternatives as having very similar costs.

Table 4–11: Capital Cost Estimates for Tier 2 Alternatives

Costs in Dollars (\$)	No Build	Enhanced Bus Grand	Streetcar Grand	Enhanced Bus Main	Streetcar Main
Guideway and Track Elements	0	0	10,946,000	0	12,296,000
Stations, Stops, Terminals, Intermodal	0	3,086,000	2,593,000	3,811,000	3,215,500
Support Facilities	0	0	8,972,000	0	8,972,000
Site work & Special Conditions	0	3,737,000	14,242,000	4,198,000	14,137,000
Systems	0	2,979,000	16,907,000	3,695,000	14,396,000
Construction Subtotal	0	9,802,000	53,660,000	11,703,000	53,017,000
ROW, Land, Existing Improvements	0	0	2,714,000	0	2,714,000
Vehicles	0	3,215,000	19,535,000	3,215,000	19,535,000
Professional Services	0	3,032,000	16,704,000	3,620,000	16,475,000
Non-Construction Subtotal	0	16,049,00	92,613,000	18,538,000	91,741,000
Unallocated Contingency	0	1,605,000	9,261,000	1,854,000	9,174,000
Total	0	17,654,000	101,874,000	20,392,000	100,915,500

Note: All costs in \$2015. Source: HDR, 2011

## 4.3.4.4 Transit Cost- Effectiveness and Efficiency

The streetcar alternatives would be more expensive to construct and operate, but they would carry many more passengers reflecting both higher ridership forecasts and greater vehicle capacity. As a result, in terms of operating cost per passenger and passengers per revenue vehicle hour, in the forecast year, streetcar service would be more effective (see Table 4–12). In the forecast year, the Main Street Streetcar Alternative would be marginally more cost effective than the Grand Boulevard Streetcar Alternative for both operating cost per passenger and passengers per revenue hour.



The operating cost per passenger (measured in 2011 dollars) show that the streetcar alternatives cost \$3.30 to \$3.60, compared to \$6.90 to \$7.50 for enhanced bus. In 2035, with large projected increases in streetcar ridership, the costs would be \$1.50 to \$1.65 for streetcar services versus \$3.20 to \$3.50 for enhanced bus. Passenger per revenue vehicle hour differentials would be similarly large. In 2015, streetcar service would carry 45 to 50 passengers per revenue hour versus 15 on enhanced bus. In 2035, streetcar service would carry between 100 and 110 passengers per vehicle hour versus 30 to 35 on Enhanced Bus.

Table 4-12: Cost Effectiveness Measures

Cost Effectiveness Measures	No Build	Enhanced Bus Grand	Streetcar Grand	Enhanced Bus Main	Streetcar Main
Ridership (Annual)					
2015	n/a	343,000	775,000	374,000	845,000
2035 (Moderate Growth Scenario)	n/a	733,000	1,697,000	804,000	1,866,000
Operating Costs (Annual; \$2011)	n/a	\$2.6 m	\$2.8 m	\$ 2.6 m	\$2.8 m
Vehicle Revenue Hours (Annual)	n/a	23,160	17,370	23,160	17,370
Capital Costs (\$2011)	n/a	\$16.7m	\$95.0m	\$19.3m	\$95.0m
Operating Cost/Passenger (\$2011)					
2015	n/a	\$7.50	\$3.60	\$6.90	\$3.30
2035	n/a	\$3.50	\$1.60	\$3.20	\$1.50
Passengers/Revenue Hour					
2015	n/a	15	45	15	50
2035	n/a	30	100	35	110

#### 4.3.4.5 Reliability

Another important evaluation criteria is the ability of the alternatives to provide dependable, relatable service. One of the most significant differences between alignments would be the impact of street closures on service operations. There are currently 21 full or partial day street closures on Grand Boulevard related to events at the Sprint Center, Crown Center, and other locations (see Table 4–13). These street closures are viewed as critical to business interests at the Sprint Center, Crown Center, and the Power and Light District, but would disrupt transit service in the corridor. By contrast, there are no street closures on Main Street.

Enhanced bus service on Grand Boulevard would be able to easily detour around Grand Boulevard street closures (as is the case with existing bus service on Grand Boulevard). However, this would not be the case with streetcar service, and a major disadvantage for the Grand Boulevard streetcar alternative would be that either streetcar service would need to disrupt special event-related street closures or the street closures would disrupt streetcar service.

Table 4–13: Street Closures by Tier 2 Alternative

Annual Summertime Street Closures	No Build	Enhanced Bus Grand	Streetcar Grand	Enhanced Bus Main	Streetcar Main
Partial Day	n/a	5	5	0	0
Full Day	n/a	16	16	0	0
Total	n/a	21	21	0	0

### 4.3.4.6 Convert Surface Parking to Higher Value Uses

The Tier 2 screening process also considered the potential of each alternative in terms of being able to effect the conversion of surface parking to higher-value land uses. The differences between modes are captured in the economic development analysis (see Develop criteria), which suggest that the streetcar service would offer a considerable advantage in terms of stimulating development as compared with enhanced bus.

Differences would also be found between the two alignments. Both alignments have a significant amount of surface and structured parking, providing significant opportunities for converting parking into higher value uses (see Table 4–14). In terms of the amount of surface parking with in a ¼ mile of each station, the differences between alignments and modes is not great, with a range from 155.9 acres (Grand Boulevard Enhanced Bus) to 158.2 (Main Street Streetcar).

Table 4–14: Surface and Structured Parking by Alternative

Acres of Parking Within ¼ mile of Stations	No Build	Enhanced Bus on Grand	Streetcar on Grand	Enhanced Bus on Main	Streetcar on Main
Surface	n/a	109.7	108.1	105.0	105.0
Structured	n/a	47.8	47.8	53.2	53.2
Total	n/a	157.4	155.9	158.2	158.2

# 4.3.4.7 Utility Impacts

The number and location of utilities could greatly impact costs associated with building a fixed-guideway system in downtown Kansas City; therefore, broadly assessing potential impact is a major consideration of the evaluation. In the case of this study, utility impacts would primarily be associated with streetcar rather than the enhanced bus or no build options. The focus of the utility impact evaluation, therefore, is assessing the differences associated with development on Grand Boulevard as compared with Main Street. The data supporting the evaluation include a combination of information from the City of Kansas City, Missouri together with information supplied by private utility companies. It includes water, sanitary sewer, storm sewer, combined sanitary and storm sewer, gas, steam/chilled water, electric and communications. While AT&T and Verizon/MCI did not provide documentation of the location of their utility lines, they did provide rankings of the alternatives. This information was included in the evaluation process.

Grand Boulevard would have the least amount of utility impacts associated with storm sewer, communication lines and steam/chilled water. Main Street, on the other hand, would have fewer water, sanitary sewer and gas utility impacts, but a very high impact on communication lines. These impacts are associated with a large duct line that contains numerous communication lines for multiple companies. As a result, the Grand Boulevard Streetcar Alternative would have fewer utility impacts as compared with the Main Street Streetcar Alternative.

#### 4.3.4.8 Provide Sustainable Funding for Corridor Improvements and Operations

A common thread that has run through stakeholder and civic leader discussions on financing is the belief that the finance plan must be downtown-focused rather than imposed Citywide. Most stakeholders



# Regional Alternatives Analysis:

generally believe that if a downtown circulator is constructed employing a fixed-guideway (such as embedded rails) it would not merely provide a beneficial transit effect, but also would provide a sense of permanence that would lead to significant investment and reinvestment in the vicinity of the fixed-guideway system. Stakeholders and civic leaders understand that any new system will likely need to be funded substantially (if not wholly) by newly created revenue, so that existing levels of transit service, and the funding thereof, are not diminished or otherwise adversely affected. Finally, all parties generally agree that aggressive efforts will need to be undertaken at the appropriate time to secure one or more Federal contributions to defray the costs of the project. On this basis, a number of guiding principles for project financing were developed:

- No dedicated city-wide sales or property tax
- Fixed rail system creates "permanence" that spurs investment
- No diversion of KCATA funding
- Maximize opportunities for Federal contribution

In order to create new funding sources that are downtown-focused, it is anticipated that the project will be constructed and financed under the auspices of a Missouri Transportation Development District, or "TDD", formed pursuant to the Missouri Transportation Development District Act, § 238.200, et seq., RSMo (the "Act"). A TDD would be a distinct entity operating as a political subdivision of the State, governed by a Board of Directors. A TDD has the statutory power to establish (after the approval of a majority vote of the qualified voters within the TDD) several sources of revenue within the boundaries (and only within the boundaries) of the TDD.

The current strategy being considered is that voters would be asked to agree to the formation of a TDD with boundaries that cover much of the downtown core. The specific boundaries remain subject to refinement, but initial thoughts are that the district would run (generally) from the Missouri River on the north to either Pershing Road or 27th Street on the south, and then from the centerline of Broadway on the west to the centerline of Locust on the east.

Of the various revenue sources that can be established by a TDD, the most expedient and reliable (reliability being important to the capital markets that will be asked to accept these anticipated bonds) would be (1) a district-wide (but only district-wide) sales tax, and (2) special assessments on property within the district (but only within the district). The project could also receive revenue from rider fares as well as advertising on vehicles and even perhaps permanent "naming rights" for vehicles.

# 4.3.4.9 Minimize/Mitigate Impacts on Natural and Historic Resources: Improve Air Quality

Based on an early, reconnaissance-level identification of issues related to environmental compliance, no significant environmental issues have been identified for any of the alternatives. Note that while this review followed the checklist for a Documented Categorical Exclusion (DCE) environmental action, it is not intended to be a DCE. This assessment included (see also Table 4–15):

<u>Location and Zoning</u> - All alternatives would be compliant with existing local zoning and planning.
 Revisions to land-use and development plans, polices and codes could enhance the success of the transit investment.



- <u>Traffic and Parking</u> Main Street and Grand Boulevard are the main north-south arterial streets within the study corridor. They are spine roads serving the heart of the Kansas City central business district. They also intersect with numerous important east-west streets over the two-mile study corridor.
  - Streetcar: Overall, based on the current traffic volumes in both corridors, it appears that there is sufficient capacity to support the addition of the streetcar in either corridor. If parking adjustments were made such that only two lanes are available in both directions on the street to be served by the streetcar, then placing the streetcar on Main Street would be preferred as it has lower current and projected future traffic volumes. However, if parking is to be removed from Grand Boulevard, then that street could better accommodate the streetcar from a roadway capacity standpoint. Conversely, that removal of parking would potentially affect a number of businesses and downtown residents/visitors.
  - **Enhanced Bus:** The enhanced bus option would not require changes to all parking spaces along a block, but it would require adjustments that facilitate fast, high-frequency operations and clear stop locations. It is not anticipated that the enhanced bus option would negatively affect either corridor in a substantial manner.
- <u>Aesthetics</u> Project features would be designed to fit within the existing streetscape and urban environment. The project design would need to be sensitive to the character of the streetscape and the general urban environment in the project area. In this case, most design elements would fit within the existing environment. However, streetcar service could require an overhead catenary system, which may be viewed as an undesirable visual feature by some parties.
- <u>Air Quality</u> Generally, relatively small projects such as a streetcar or enhanced bus service do not have a significant effect on local or regional air quality or greenhouse gases, *but* they can contribute to lower VMT, which can contribute to small improvements in local and regional air quality.
- Coastal Zone The study area is not in or near a designated coastal zone management area.
- <u>Hazardous Materials</u> The 2009 Light Rail Transit (LRT) Alternatives Analysis included a complete database search of state and Federal environmental records (over 20 databases and lists) as well as a review of Sanborn Fire Insurance Maps. The current study corridor is quite similar to the proposed 2009 LRT corridors in the downtown area. Both considered Main Street and Grand Boulevard as possible routes. Therefore, it is expected that the six High and Medium priority sites identified for the downtown area for the 2009 study would apply to similarly to the current evaluation. Of the identified sites, three are along or in the vicinity of Grand and one is along Main Street (see Table 4–15).

For the enhanced bus alternatives, very little construction would be required (e.g. shelters and signs). Therefore, it should be possible to avoid the sites referenced above and/or implement the project without hazardous waste site impacts.

For the streetcar alternatives, the construction would include shallow excavation to install the track slab and rails, as well as stations, signage, and the required power lines. Most if not all of this construction is expected to occur within the existing public right-of-way. Therefore, it should still be possible to avoid the sites listed above and/or implement the project without hazardous waste site impacts.



Table 4–15: Comparison of Environmental and Historic Effects for Tier 2 Alternatives

	Table 4–15: Comparison	of Environmental and Hist	oric Effects for Tier 2 Alteri	natives
Environment al Measure:	Enhanced Bus on Grand	Streetcar on Grand	Enhanced Bus on Main	Streetcar on Main
Visual/Aesthetics	No catenary system	Overhead catenary system added to corridor. Catenary system may result in greater visual impact due to higher number of NRHP-eligible properties (see historic and cultural)	No catenary system	Overhead catenary system added to corridor
Air Quality	Operation emissions - diesel engines would contribute emissions (CO, NOx, SOx, VOCs, PM). Construction emissions – fugitive dust and equipment (CO, NOx, SOx, VOCs, PM)	Operation emissions - electric engines would contribute no emissions. Construction emissions – fugitive dust and equipment (CO, NOx, SOx, VOCs, PM)	Operation emissions - diesel engines would contribute emissions (CO, NOx, SOx, VOCs, PM). Construction emissions – fugitive dust and equipment (CO, NOx, SOx, VOCs, PM) Due to existing constrained roadway capacity, may require hot spot analyses at major intersections.	Operation emissions - electric engines would contribute no emissions. Construction emissions – fugitive dust and equipment (CO, NOx, SOx, VOCs, PM) Due to existing constrained roadway capacity, may require hot spot analyses at major intersections.
Noise and Vibration	Noise from buses would be similar to existing bus operations	Noise from Streetcar operations would be generally similar to trucks and buses operating in the streets Noise analysis would be necessary where there are sensitive receptors along the route such as Residential uses.	Noise from buses would be similar to existing bus operations	Noise from Streetcar operations would be generally similar to trucks and buses operating in the streets Noise analysis would be necessary where there are sensitive receptors along the route such as Residential uses.
Historic and Cultural	19 NRHP-listed properties 27 NRHP-eligible properties	19 NRHP-listed properties 27 NRHP-eligible properties	19 NRHP-listed properties 13 NRHP-eligible properties	19 NRHP-listed properties 13 NRHP-eligible properties
Parks (& Section 4(f)/6(f))	1 park 1 trail crossing 4 KCPRD pkwy/blvds (including Grand) No 6(f) properties	1 park 1 trail crossing 4 KCPRD pkwy/blvds (including Grand) No 6(f) properties	1 park 2 fountains 1 trail crossing 2 KCPRD pkwy/blvds No 6(f) properties	1 park 2 fountains 1 trail crossing 2 KCPRD pkwy/blvds No 6(f) properties
Natural Resources	same	same	same	same
Biological Resources			Peregrine falcon nest, Commerce Tower	Peregrine falcon nest, Commerce Tower
Water Quality	same	same	same	same

Environment al Measure:	Enhanced Bus on Grand	Streetcar on Grand	Enhanced Bus on Main	Streetcar on Main
Construction	There would be limited construction of new transit facilities with the bus alternatives	Construction of new trackway, stops, maintenance facility and related improvements. Construction would be almost exclusively within the street right-of-way Construction effects would be temporary and could take approximately 2 years overall, but could be much shorter in any single location. Key construction effects would be to traffic, parking and access to uses adjacent to the improvements.	There would be limited construction of new transit facilities with the bus alternatives	Construction of new trackway, stops, maintenance facility and related improvements. Construction would be almost exclusively within the street right-of-way. Construction effects would be temporary and could take approximately 2 years overall, but could be shorter in any single location. Key construction effects would be to traffic, parking and access to uses adjacent to the improvements.

Table 4-16: Locations with Potential Hazardous Materials

		<b>D</b>	Description
3920 Main Street	Name NA - Spill Site	Priority High	"The site is listed as a Spill site. According to the EDR database report, a tenant at the site reported a petroleum fluid seeping through cracks in the building foundation. The fire department believed the fluid was fuel oil from an unknown Underground Storage Tank (UST). A test of the fluid indicated that the material may be solvents from a former on-site dry cleaner. No other actions were reported for the site."
Grand Ave. and 18th St. (Sanborn Map Year 1963)	Filling station with gasoline tanks	High	" it is likely a majority of the noted USTs have been removed. However, due to the age of the sites, UST
100 feet south of Grand Ave. and 20th St. (Sanborn Map Year 1963)	Filling station with gasoline tanks	High	design standards pre-dating the late 1980s, and the lack of significant environmental regulation prior to the late 1960s, it is likely that many of the USTs had releases and the impacted soils and groundwater were not remediated following removal of the USTs. Petroleum products that may have been released at these historical sites has likely attenuated to a degree, but without further investigation, the level attenuation and impact is not known."

Source: Compiled by HDR Engineering, Inc. from 2009 Light Rail Transit Alternatives Analysis, Kansas City Area Transportation Authority (KCATA)

Based on the available information, it does not appear that there are any major hazardous-materials-related obstacles to implementing enhanced bus or streetcar service on either Main Street or Grand. The small number of sites, with the distribution noted, also does not indicate that one street alignment should be substantially preferred over the over with respect to hazardous materials.



- Navigable Waterways While the Missouri River is less than 1,500 feet from potential northern termini of the project alternatives, none are considered close enough to impact the waterway.
- Noise and Vibration Noise and vibration effects from buses on either Main Street or Grand Boulevard would be similar to what exists today with the operations of the MAX and other buses in the study area. Noise and vibration effects from streetcars would be relatively similar to the effects of existing buses and trucks in the area. In addition, it has generally been found that vibration is not a significant issue related to operations of a streetcar project unless there is a particularly sensitive building or function along the alignment and in close proximity to the trackway. Potentially sensitive receptors along the routes have not yet been specifically identified, but could include residences and performance venues located very close to the tracks. Construction of project improvements would likely include both noise and vibration that would be short term and temporary in nature.
- <u>Prime and Unique Farmlands</u> None of the alternatives, which are all located in or near downtown Kansas City, Missouri, would involve the use of any prime or unique farmlands.
- <u>Biological and Natural Resources</u> Due to the built-up urban environment of the study area, minimal to no impacts to natural and biological resources are anticipated.
- <u>Cultural and Historic</u> There are a number of NRHP-listed and NRHP-eligible structures within the study area, and any structure or other potential historic resource over 50 years of age could be eligible for protection under city, state, and federal historic preservation regulations. Because historically, streetcars were instrumental in the development of downtown Kansas City, reintroduction of modern streetcars would not generally be incompatible with the historic character of the area.
- <u>Parklands</u> None of the alternatives would have a direct impact on any parks. However, the Kansas
  City Parks and Recreation Department (KCPRD) has jurisdiction over Grand Boulevard. As a result,
  any transit improvements along Grand Boulevard would need to be coordinated with KCRPD.
- <u>Seismic</u> There are no known seismic conditions associated with the alternatives. However, all project improvements would be designed to applicable seismic standards.
- Water Quality and Hydrology No water quality or hydrology impacts were identified. However, because the study area is located within the Turkey Creek/Central Industrial District Basin identified in the 2010 Consent Decree (which prescribes sewer improvements the City will make over the next 25 years), green infrastructure solutions as well as construction best management practices (BMPs) would need to be identified for the selected alternative and would be required during implementation as part of the project design.
- Construction Impacts The effects of construction would vary, depending on the selected project. If either of the bus alternatives were selected, there would be limited new construction in the study area for project improvements. If either of the streetcar alternatives were selected, there would be short-term construction in the study area including the trackway, stops, power substations, overhead centenary, a maintenance facility and related improvements. Construction would generally be within the street right-of-way, and would take approximately 2 years from the beginning of construction to operations. Construction methods could be employed that would limit construction in any one location to a much shorter period. Primary effects of construction would be to traffic, parking, and access in the vicinity of the project improvements. Access to adjacent uses could be maintained to all uses during construction.



Construction of the project would generate local jobs during the construction period and could provide economic benefits to businesses that support the construction efforts. Conversely, temporary construction activities can disrupt business operations in the vicinity of the construction area.

 <u>Property Acquisition</u> - Generally, none of the alternatives would require the acquisition of property. However, some of the alternatives involving the streetcar mode may require the acquisition of property for a vehicle maintenance and storage facility. Most of the sites under consideration for a maintenance facility are publicly owned.

# 4.3.5 Summary of the Tier 2 Evaluation

Overall, the Tier 2 evaluation identified the Main Street Streetcar as the strongest candidate for the LPA. While several criteria showed no measurable difference between alternatives, there were several criteria where either the Main Street alignment and/or the streetcar option demonstrated considerable advantages over the Enhanced Bus mode. The criteria that largely influenced the local review and agency preferences include the connections to the activity centers, the economic development potential, public and stakeholder input, and service effectiveness as shown in Table 4–17.

Table 4–17: Summary of Evaluation Results of the Primary Criteria for the Tier 2 Alignments and Modes

Primary Criteria	Strongest Alignment	Strongest Mode
Activity Center Connections	Main Street	None
Activity Levels	None	None
Pedestrian and Bicycle Connections	None	None
Economic Development Activity	None	None
Economic Development Potential	Main Street	Streetcar
Residential and Employment Activity	Main Street	Streetcar
Transit Reliability	Main Street	None
Public and Stakeholder Input	Main Street	Streetcar
Ridership	Main Street	Streetcar
Capital Costs	None	Enhanced Bus
Service Effectiveness	Main Street	Streetcar
Environmental and Natural Resources	None	None
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Note: this table shows a summary of the Tier 2 evaluation. Refer to the text of section 4.3 for additional details.



# 5. Public Involvement

When the downtown corridor alternatives analysis study began in early 2011, one of the early efforts was to develop a Public Participation Plan<sup>10</sup>. The plan was developed and executed by the Partnership team with consultant assistance from the HDR consultant team, and specifically Patti Banks Associates. The purpose of the plan was to provide a framework from which to guide the public participation process for the downtown corridor AA.

# 5.1 Overview of Public Involvement Program

The public participation effort was based on the belief that people whose lives would be affected by planning and investment decisions have a right to be involved in the decision-making process and influence choices that are made. The public participation program was designed to be a proactive process in which the governing bodies worked to engage the affected public in a variety of opportunities to become involved, and included a meaningful and transparent process that ensured effective communication about how public participation would influence the decisions.

The partnership team was fully committed to a public participation process that:

- Involved the public in decisions that could affect their lives
- Ensured that the public's contribution would influence the decision-making
- Communicated how the public's contribution would influence decisions
- Was adaptable and sensitive to diverse audiences
- Promoted respect
- Provided equal access to opportunities, information and education
- Was consistent and reliable
- Promoted continued engagement
- Allowed for flexibility and use of creative approaches
- Maintained honesty and integrity throughout the process
- Encouraged early and active participation
- Involved process evaluation and monitoring tools

During the study, the public outreach effort included three open houses, scheduled around key milestones. They were planned to provide information to the public about the study, gather feedback on the study and Locally Preferred Alternative decision, gain input on the financing strategies considered for the project, and inform the public and decision-makers about the community issues and concerns. The three open houses were generally planned and scheduled as follows:



<sup>&</sup>lt;sup>10</sup> KC Downtown Corridor Alternatives Analysis: Public Participation Plan, May 2011

- The first open house was to share with the public the early draft materials and receive feedback from the public on:
  - Draft goals and objectives,
  - Draft purpose and need,
  - Preliminary list of alignment options for Tier 1 Analysis.
- The second open house was planned to share the early results of the Tier 1 screening of alignment options.
- The third open house was planned to share the early results of the Tier 2 screening of the Enhanced Bus and Streetcar Alternatives for Main Street and Grand Boulevard.

MARC hosted a project web site located on the <a href="www.kcsmartmoves.org">www.kcsmartmoves.org</a> web page for the downtown corridor alternatives analysis materials. The web site was regularly updated with the most current study materials, invitations to the study's open houses, etc. The Project Team also distributed a series of media kits throughout the duration of the project. The kits included fact sheets, media releases, display adds, Frequently Asked Questions, and a list of Partnership Team contacts to provide updates on key milestones. In addition, e-mail blasts were used to share study information, such as open house notices, and summaries of public input, along with other key milestone information. Social Media was also employed to reach out to the public.

# 5.2 Summary of Public Feedback

As described above, the public outreach process included a variety of methods to engage the public in the study. The following section summarizes the outreach efforts and feedback received.

# 5.2.1 Public Open House #1

This open house was held on June 21, 2011 from 4:00 to 6:30 PM at the Central Branch of the Kansas City Public Library at 14 W 10<sup>th</sup> Street in Kansas City. Two short and identical presentations were given at 4:30 and 5:30.

Notice of the open house was provided via press release, www.smartmoves.org email blast, bus bulletin, Facebook, and stakeholder meeting announcements.

A total of 113 people attended the open house in addition to project team members. Attendees included local public officials and staff;







downtown residents; business representatives; neighborhood groups; umbrella agencies; advocacy groups; and television, print and radio news media.

The purpose of the meeting was to provide targeted stakeholder groups and the general public and media with an overview of the downtown corridor AA as well as to:

- Share information about:
  - How the AA differs from previous studies
  - The planning process and Schedule for the AA
  - Differences between transit modes, such as the modern streetcar and circulator bus
  - Alignment options for the potential fixed-guideway starter line
  - Eventual development of a Locally Preferred Alternative (LPA) and general financing strategies.
- Gather feedback on:
  - Draft Goals and Objectives
  - Draft Purpose and Need
  - Preferred alignments
  - Preferred modes

#### Handouts provided to meeting participants included:

- Meeting Overview
- Project Fact Sheet
- Project Comment Form
- Meeting Evaluation Form

#### **Exhibits** at the meeting included:

- Welcome: Relevant meeting information
- Overview: Project description
- Process and Schedule: General project details
- Project Purpose and Need: Purpose and need statement
- Modes of Transit: Circulator bus and modern streetcar comparison
- How to Pay for If: Guiding principles and potential sources of funding
- Next Steps: Planning process activities for July September 2011
- Stay Informed: www.smartmoves.org

#### **General Summary of Comments** received:





Fifty (50) hardcopy and 14 electronic comment cards were returned to the project team plus other comments received in a variety of ways, e.g. by email, phone, or letter, during the weeks that followed the open house. Generally, the feedback received related to:

- Improve transit downtown:
  - For visitors, residents, and workers alike
  - Due to issues with the current bus system (general and MAX), e.g. timing/scheduling, confusing routes
  - Better connect destinations
  - Improve convenience
  - Decrease dependence on the automobile
  - Improve the urban core and spur development
  - Help Kansas City compete with other cities
- Agreement on the purpose and need statement, noting that the starter line could:
  - Trigger economic development and encourage infill
  - Support continual growth downtown
  - Represent permanent downtown investment
  - Create better transit connections and circulation, particularly for short trips
  - Be the beginning of fixed-guideway transit in Kansas City
  - Support tourism
- Interest in the modern streetcar because it would:
  - Use permanent rails
  - Be a predictable, fixed-route circulator
  - Have a positive connotation/perception
  - Offer an easy riding experience
  - Demonstrate permanence of investment
- Interest in all of the alignment alternatives
  - Most comments focused on Main Street and the Main Street/Walnut couplet and other
    provided alternatives, but one respondent suggested that Wyandotte Street be studied among
    the alignment alternatives.
- Other comments
  - Excited about the project.
  - Connections into or through the City Market Additional detail and presentation requested.



- Potential for expansion and connection with other transit routes
- Integration and accommodation of bicycles with the starter line
- Expanded bus service as a better mode choice than streetcar
- Consideration and accommodations for the Performing Arts and Sprint Centers events and/or activities.
- Request for additional streetcar details, .e.g. operations, hours of service, funding mechanisms, potential rider fares/ticketing, potential ridership, timing for construction, etc.

# 5.2.2 Public Open House #2

This open house was held on August 31, 2011 from 8:00 AM to 6:30 PM in the Grand Hall of Union Station (30 West Pershing Road) in Kansas City. No formal presentations were given. The open house was held in conjunction with the Regional Transit Alliance's (RTA's) Streetcar Party from 7 AM to 7 PM at Union Station on the same day to give the public a "sneak peak" at the physical examples of the types of streetcar and bus alternatives under consideration in the downtown corridor AA study.

**Notice** was provided via press release, www.smartmoves.org email blast, bus bulletin, Facebook, and stakeholder meeting announcements.

Approximately 900 people participated in the Streetcar Party, including nearly 280 who signed in to attend the open house, 300 who toured the Kinkisharyo ameriTRAM vehicle, 160 Regional Transit Alliance raffle participants, and 150 registrants for the transportation-inspired musical performance in addition to project team members. Attendees included local public officials and staff; downtown residents; business representatives; neighborhood groups; umbrella agencies; advocacy groups; and television, print and radio news media.



The purpose of the open house was to provide targeted stakeholder groups and the general public and media with an overview of the downtown Corridor

AA as well as to:

- Share information about:
  - Purpose and need for the AA
  - How the AA differs from other efforts
  - Planning process and schedule for the AA
  - Differences between transit modes
  - Tier 1 evaluation of alignment options for a potential fixed-guideway starter line
  - Tier 2 evaluation of the Grand Boulevard and Main Street bus and streetcar alternatives
  - Development of a Locally Preferred Alternative (LPA) and general financing strategies for it.
- Gather feedback on:
  - Tier 2 evaluation criteria that should be considered
  - General comments.

**Handouts** provided to meeting participants included:

- Meeting Overview
- Project Comment Form
- Meeting Evaluation Form

#### **Exhibits** at the meeting included:

- Welcome: Relevant meeting information
- Overview: Project description
- Process and Schedule:
   General project details
- Project Purpose and Need:
   Purpose and need statement
- Modes of Transit: Circulator









bus and modern streetcar comparison

- June Alignment Alternatives: Maps of the seven alignment options
- Tier 1 Evaluation: Evaluation Criteria and results of the process to narrow the seven alignment options to two.
- August Alignment Alternatives: Grand Boulevard and Main Street
- How to Pay for It: Guiding principles and potential sources of funding
- Next Steps: Planning process activities for July September 2011
- Stay Informed: <u>www.smartmoves.org</u>

#### **General Summary of Comments** received:

Forty-five (45) hardcopy project comment cards and 24 meeting evaluation forms were returned to the project team during the weeks that followed the open house. Generally, the feedback received related to:

- Factors that should be considered during the Tier 2 evaluation:
  - Potential for starter line expansion to: Country Club Plaza, 18<sup>th</sup> and Vine, Waldo area, North of the River (including the airport) Johnson County, east, etc.
  - Simplicity of alignment, e.g. straight as possible
  - Ability of the working population to access the starter line for work, food/groceries, and other transit connections, e.g. Main Street MAX, potential Main Street Light Rail. Streetcar operation factors may impact the MAX.
  - Ridership generated for working populations
  - Bicycle accommodations
  - Interior streetcar design
  - New development opportunities within the streetcar corridor and beyond
  - Energy efficiency
  - Emergency procedures
  - Ease of construction
  - ADA requirements
  - Park-and-ride potential
  - Advertising ability
  - Tourism
- Funding:
  - How much will the project cost?



- What are the funding sources?
- To whom would the assessment be applied?
- What benefits would assessed properties receive?
- Would incentives be offered to businesses?
- Grand Boulevard Alignment:
  - Serves all the centers
  - Connects Jobs
  - Relates to the "making Grand Boulevard Grand" project
  - Is straighter
- Main Street Alignment
  - Connects to grocery, entertainment residential and work locations
  - Is central to downtown
  - Would have parking impacts
- Logistics
  - Where and how to pay for tickets
  - Hours of operation
  - Trip length
  - City Market connections and alignments
- Other
  - Like light rail from Waldo to the KCI Airport
  - Coordinating and informing the rental population about the Project

## 5.2.3 Public Open House #3

This open house was held on **September 20, 2011** from **4:00 to 6:30 PM** at the **Arabia Steamboat Museum** (400 Grand Boulevard) in Kansas City. No formal presentations were given.

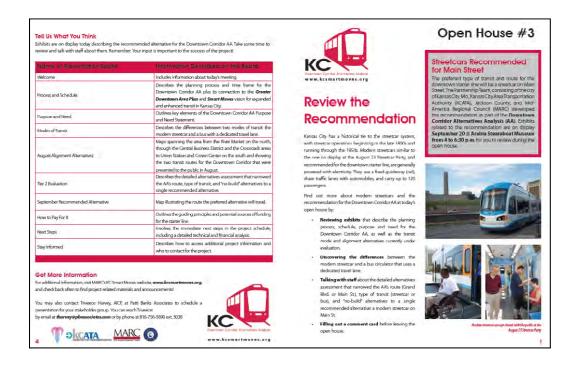
**Notice** was provided via press release, <u>www.smartmoves.org</u> email blast, bus bulletin, Facebook, and stakeholder meeting announcements.

**Forty-nine (49) people attended** in addition to project team members. Attendees included local public officials and staff; downtown residents; business representatives; neighborhood groups; umbrella agencies; advocacy groups; and television, print and radio news media.



The purpose of the open house was to provide targeted stakeholder groups, the general public and the media with an overview of the recommendation for a preferred mode and alignment for the downtown starter line as well as to:

- Share information about the:
  - Planning process and schedule for the AA
  - Detailed Tier 2 evaluation of the Grand Boulevard and Main Street bus and streetcar alternatives
  - Alignment and mode recommendations
  - General Finance Strategy
- Gather feedback on:
  - Tier 2 evaluation
  - General comments, issues and concerns.



#### Handouts provided to meeting participants included:

- Meeting Overview
- Project Comment Form
- Meeting Evaluation Form

#### **Exhibits** at the meeting included:





- Welcome: Relevant meeting information
- Overview: Project description
- Process and Schedule: General project details
- Project Purpose and Need: Purpose and need statement
- Modes of Transit: Circulator bus and modern streetcar comparison
- August Alignment Alternatives: Grand Boulevard and Main Street
- Tier 2 Evaluation: Detailed assessment that narrowed the AA's route, type of transit
- September Alignment Alternative: Recommendation to select Main Street Streetcar as the preferred alternative
- How to Pay for It: Guiding principles and potential sources of funding
- Next Steps: Planning process activities for July September 2011
- Stay Informed: <u>www.smartmoves.org</u>

#### **General Summary of Comments** received included:

Seven (7) hardcopy project comment cards and 23 meeting evaluation forms were returned to the project team during the weeks that followed the open house. Generally, the feedback received related to:

- General praise/excitement for the Project
  - Interest in Phase II plans
  - Potential benefits to the community
- Project Concerns
  - 5<sup>th</sup> Street between Grand Blvd. and Main St. Road is congested
  - 3<sup>rd</sup> Street from Grand Blvd to Crown Center impacts to the Main ST. MAX Bus route
  - Need accommodations for the disabled
  - Coordination with the "making Grand Boulevard Grand" Project
  - Desire for curbside services
  - Desire for stops in the same location as Main St. Max stops
  - Financial strategy includes taxes
  - Integration of the streetcar with the existing transit system

#### Other

 Suggested streetcar frequency simulation for passengers with buses running when the streetcar would operate – public relations opportunity





Suggest test run of streetcar route using buses – gather statistical data to confirm that Main St. should move forward as the preferred route.

# 6. Costs and Finance

This section summarizes the information on the estimated costs and potential financing options for a new transit project in the downtown corridor in Kansas City. At this very early stage of the project, both the costs and funding options should be considered preliminary, and are most effective for comparison purposes. More firm cost and finance analysis will be needed for the project, and would occur as the project moves forward. More advanced cost estimating would be done as the engineering details advance. The cost and financing will be affected by many decisions and choices that are yet to be made by the local sponsoring agencies.

# 6.1 Capital Cost Estimates

The project team developed estimates of capital costs for the alternatives evaluated in Tier 2, including the two enhanced bus and two streetcar options on Main Street and Grand Boulevard. These estimates are early order-of-magnitude estimates and should be used at this point primarily for comparative purposes. The estimates are based on a conceptual level of engineering and technical evaluation of the potential alignments.

A summary of the project costs are shown in Table 6–1 and Table 6–2. For detailed assumptions, methodology, etc, the reader is encouraged to refer to the Conceptual Engineering documents including the Basis of Design, Cost Methodology, Utility Technical Memorandum and Maintenance Facility Reports.

Table 6-1: Estimated Capital Costs for Streetcar Alternatives

	Main Street	Grand Boulevard
Total Project Cost	\$101.0 M	\$102.3 M
Total Length (Track Miles)	4.1	3.7
Cost per Track Mile	\$24.6 M	\$27.6 M

 $Source: KCMO\ Downtown\ Circulator\ AA-Opinion\ of\ Probable\ Costs\ Summary,\ HDR,\ September\ 16,2011.$ 

Table 6–2: Estimated Capital Costs for the Enhanced Bus Alternatives

	Main Street	<b>Grand Boulevard</b>
Total Project Cost	\$20.4 M	\$17.7 M
Total Length (Trip Miles)	4.8	4.4
Cost per Mile	\$4.3 M	\$4.0 M

Source: KCMO Downtown Circulator AA - Opinion of Probable Costs Summary, HDR, September 16, 2011.

# **6.2 Operations Cost Estimates**

The project team developed estimates of operating and maintenance costs for the alternatives evaluated in Tier 2, including the two enhanced bus and two streetcar options on Main Street and Grand Boulevard. These estimates are early order-of-magnitude estimates and should be used at this point primarily for comparative purposes because estimates are based on a conceptual operating scenario and interface with other existing and planned future transit service.

Operating costs for the Tier 2 Alternatives would be related to the mode of service operated and the amount of service provided. At any given level of service, streetcar service is inherently more expensive





to operate than bus service, largely due to higher infrastructure (tracks and power system) and vehicle maintenance costs. However, in many cases, because streetcars have higher capacities and shorter dwell times than buses, less service is required, and this can offset the higher unit operating costs.

### 6.2.1 Streetcar and Enhanced Bus Unit Operating Costs

Three other cities (Portland, Seattle, and Tacoma) operate modern streetcar service. The bus and streetcar costs in those cities range from \$175 to \$386 per revenue vehicle hour (RVH). In cities that operate historic streetcars, streetcar costs are generally 35 to 50% higher than for regular bus service, with the exception of Tacoma, and these differentials are similar for modern streetcar service.

Enhanced bus costs would be somewhat higher than costs for regular bus service, as there would be higher maintenance costs for enhanced bus vehicles, station facilities, and bus lanes/queue jump lanes. These costs would be similar to KCATA's MAX service. For the purposes of these estimates, it was assumed that increases in infrastructure and vehicle maintenance costs would generally be similar to offsets in other areas. On this basis, in 2015, enhanced bus costs, again assuming 3.5% inflation per year, would be \$127 per revenue vehicle hour.

### Service Levels and Vehicle Requirements

All alternatives were initially assumed to operate in the same manner, which would include:

- Hours: Monday through Thursday from 6:00 am to 12:00 midnight; Friday and Saturday from 6:00 am to 2:00 am; Sundays from 8:00 am to 9:00 pm.
- Frequency: Monday through Thursday every 10 minutes from 6:00 am to 9:00 pm and every 20 minutes from 9:00 pm to 12:00 midnight; Fridays and Saturdays every 10 minutes throughout the day; Sundays every 20 minutes throughout the day.

Once the conceptual operating plans were developed, it was determined that three streetcars could provide 10-minute service frequencies along Grand Boulevard (Streetcar on Grand Alternative), but only every 11 minutes along Main Street (Streetcar on Main Alternative). Since an additional streetcar vehicle would cost more than \$4 million and increase operating costs by more than 30%, 10/20 minute streetcar service was assumed for Grand Boulevard and 11/22 minute service was assumed for Main Street.

For Enhanced Bus service, service with both the Main Street and Grand Boulevard alternatives could operate every 10/20 minutes. However, whereas streetcar service could be provided with three vehicles, longer bus dwell times (largely for wheelchair boardings and alightings, and the loading of and unloading of bicycles with front-mounted bike racks) would increase running times to the extent that 10-minute (or 11-minute) service is expected to require four buses.

#### **Annual Operating Costs**

Based on the unit costs and service levels described above, 2015 operating costs for either streetcar alternative are estimated at \$3.2 million per year (see Table 6–2), with the only difference being that Grand Boulevard Streetcar service would operate every 10/20 minutes, while Main Street Streetcar service would operate every 11/22 minutes.



Table 6–3: Projected Annual Operating Cost Estimates for Tier 2 Alternatives

	Grand Enhanced Bus	Grand Streetcar	Main Enhanced Bus	Main Streetcar
2011	\$2,572,202	\$2,777,978	\$2,572,202	\$2,777,978
2014	\$2,851,846	\$3,079,994	\$2,851,846	\$3,079,994
2015	\$2,951,661	\$3,187,793	\$2,951,661	\$3,187,793

Source: Nelson Nygaard, October 2011

The Enhanced Bus alternatives would both cost approximately 7% less than streetcar service. The differential would be relatively low, because as described above, four buses would be in service at most times for Enhanced Bus service, versus three streetcars for streetcar service. Table 6-3 details the projected operating costs.

#### Maintenance Facility Cost Estimates

For both of the Streetcar Alternatives, a new maintenance facility would be required. For the Enhanced Bus Alternatives, bus maintenance could be accommodated at or through expansion of an existing bus maintenance facility.

For the **Streetcar Alternatives**, the Capital Cost estimates include an allowance to cover the cost of a maintenance facility building, trackwork and systems and site acquisition. The selection of a site for the maintenance facility has not been done, so the estimate should be considered an allowance, until a site is selected and more detailed design and cost estimates can be prepared. The capital cost allowance estimate for a maintenance facility for both Streetcar Alternatives is **\$8.9 million (\$2011)**.

For the **Enhanced Bus Alternatives**, the Capital Cost estimates include an allowance for expansion of an existing bus facility. The capital cost estimate allowance for maintenance facility expansion for both Enhanced Bus Alternatives is **\$150,000**.

#### 6.3 Finance

During this Alternatives Analysis phase, the key task related to finance was to conduct an analysis of financing options to identify sources that could be used to support the locally preferred alternative. Financing options were examined for both Capital (construction) and operations and maintenance. The consultant team, in consultation with the Partnership Team, identified a wide range of potential Finance opportunities on both the local and federal levels that could be used to help fund a project in the Corridor. Private funding options and public-private partnership options were also explored. A candidate list of potential sources for both capital and operating needs was developed and rated for potential success as well as the ability to raise sufficient resources to accomplish the selected project.

The consultant team, in cooperation with the Partnership team, developed a series of guiding principles and a broad-brush approach to financing the costs of the Project. Also, consultation with downtown corridor stakeholders has been a key part of the finance research and development so far. These early efforts led to the identification of a few of Guiding Principles for financing of a downtown project. The guiding principles include:



- No dedicated city-wide sales or property tax.
- Fixed rail system creates "permanence" that spurs investment.
- No diversion of KCATA funding.
- Maximize opportunities for Federal contribution.

A common thread that has run through much of the stakeholder and civic leader discussions is the belief that the finance plan for the downtown project must be downtown-focused rather than imposed over the City as a whole in order to be viable. Most generally believe that a downtown circulator constructed employing a fixed guideway (such as embedded rails) will not merely provide beneficial transit effects, but also (importantly) will provide a sense of permanence that will lead to significant investment and reinvestment in the vicinity of the fixed-guideway system. The consultant team, as well as stakeholders and civic leaders, understand that any new system will likely need to be funded substantially (if not wholly) by newly created revenue, so that existing levels of transit service, and the funding thereof, are not diminished or otherwise adversely affected. Finally, all parties generally agreed that aggressive efforts should be undertaken at the appropriate time to secure one or more Federal contributions to support the locally provided finance effort for the Project.

## **Potential Local Funding Sources**

- **Missouri Transportation Development District**, or "TDD", formed pursuant to the Missouri Transportation Development District Act, § § 238.200, *et seq.*, RSMo (the "Act").
- ♦ A District Sales Tax A district-wide sales tax of approximately one percent.
- Property Assessments Annual special assessments on real property within the TDD based on assessed value.
- Annual special surface parking assessments on commercial surface parking spaces within the TDD.
- Fares rider fares.
- Advertising revenue from on-vehicle signage and other advertising opportunities.

#### Potential Federal Funding Sources

- New Starts, Small Starts and Very Small Starts (FTA Section 5903 Funds).
- Urban Circulator Grants.
- TIGER Grants.
- Other federal appropriations or authorizations.



# 7. The Locally Preferred Alternative

The purpose of this section is to document the Locally Preferred Alternative (LPA) for the Kansas City downtown corridor. It documents the decision, including mode, alignment, general stop locations, service characteristics, etc; summarizes the analysis, public and stakeholder engagement and local agency decisions leading to the LPA selection; and, provides an overview of the basis for the selection of the LPA.

#### 7.1 The LPA Decision Process

The process of selecting the Locally Preferred Alternative for the downtown corridor included the following steps:

- The consultant team presented the Tier 2 evaluation to the Partnership Team on September 19, 2011, along with a preliminary recommendation of Streetcars on Main Street for the LPA.
- After reviewing the technical analysis and public input from the Open Houses, the Partnership team made an initial recommendation for the Locally Preferred Alternative (LPA) to the Downtown Parking and Transportation Commission.
- The Downtown Parking and Transportation Commission held a public meeting on September 20, 2011. After a presentation on the study findings by project staff, and hearing from the public in attendance at the meeting, the commission passed a recommendation to the City Council to select Streetcar as the Mode and Main Street as the alignment for the Locally Preferred Alternative.
- The City Council held an additional public meeting on September 29, 2011 to review the recommendation of the Parking and Transportation Commission. Staff presented the study analysis and findings. An overview of the recommendation from the Downtown Parking and Transportation Commission was presented. Public testimony was received and the City Council accepted and adopted the recommendation from the Parking and Transportation Commission to select Streetcars on Main Street as the Locally Preferred Alternative. A copy of the City Council Resolution is included in Appendix A.
- The board of KCATA adopted the Streetcar on Main Street as the Locally Preferred Alternative on December 14, 2011. A copy of the KCATA Resolution is included in Appendix A.
- The MARC Board adopted the Streetcar on Main Street as the Locally Preferred Alternative on January 24 2012. A copy of the MARC Resolution is included in Appendix A.

# 7.2 LPA Project Description

The selected LPA is a modern streetcar service operating between River Market and Crown Center in downtown Kansas City via Main Street. In summary, this service would be:

- Service would be provided with single-vehicle trains
- Service would largely operate in mixed traffic
- Stations would be spaced approximately every two blocks (due to the circulator nature of the service)
- Stations would be small in scale, and size to accommodate a single streetcar.



A description of modern streetcar service, including photos of typical applications, is included in Chapter 3. Additional information specific to the LPA is provided below. Further definition and refinement of the LPA will occur in subsequent steps of the project development process.

#### 7.2.1 **Mode**

The modern streetcar is the recommended transit mode for the downtown corridor. This mode best meets the project's Purpose and Needs and the goals and objectives as outlined in Chapter 2. The streetcar mode had the most significant public and stakeholder support, as demonstrated in Chapter 5.

As illustrated in Chapter 3, modern streetcars are single-unit low-floor vehicles with articulated sections that allow them to navigate tight turns. They typically carry approximately 30 seated passengers and 100 standing passengers; this configuration is common because most trips are short and standing is often convenient. They also have interior room for on-board fare vending and bicycles.

Modern streetcars are typically powered by overhead catenary, although some can travel for short distances using battery power. (New technologies are now under development that would allow for underground power supply, but there are none in production or operation yet.) The vehicles are designed for in-street mixed-traffic operation and can also operate in exclusive environments.

## 7.2.2 Alignment

The recommended alignment for the downtown corridor is the Main Street Alternative and is shown on Figure 7-1. This alignment best meets the project's Purpose and Need Statement, and the goals and objectives as outlines in Chapter 2. This alignment also had the most significant public and stakeholder support, as noted in Chapter 5.

The length of the alignment is approximately 2.11 miles. The northern terminus of the alignment is the intersection of 3<sup>rd</sup> Street and Grand Boulevard. The southern terminus of the alignment is the intersection of Grand Boulevard and Pershing Road. The alignment segments from north to south are as follows:

- Grand Boulevard between 3<sup>rd</sup> Street and 5<sup>th</sup> Street
- 5<sup>th</sup> Street between Grand Boulevard and Delaware Street
- Delaware Street between 5<sup>th</sup> Street and 7<sup>th</sup> Street
- Main Street between 7<sup>th</sup> Street and Pershing Road
- Pershing Road between Main Street and Grand Boulevard

#### 7.2.3 Connectivity

The LPA would offer connections to transit at three major locations:

- Grand Boulevard at 3<sup>rd</sup> Street new KCATA transit center with connections to KCATA services
- Main Street at 10<sup>th</sup> Street connections with KCATA services at the existing 10<sup>th</sup> & Main transit center
- Main Street at Union Station connections with potential regional rail services at Union Station or elsewhere in downtown.



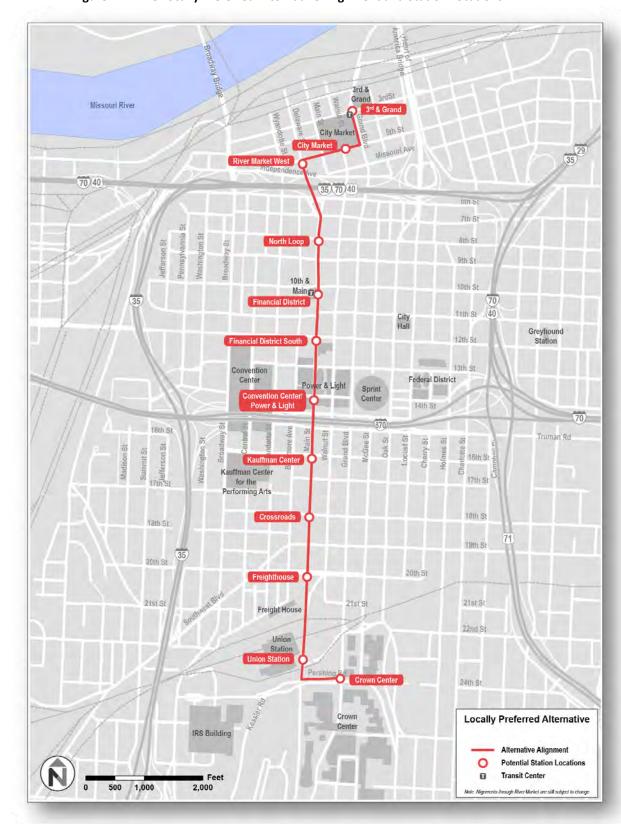


Figure 7-1: The Locally Preferred Alternative Alignment and Station Locations



#### 7.2.4 Stations

The LPA would include 12 station pairs (one for each direction on each side of the street) as shown on Figure 7-1. The general locations of the stations associated with the LPA, listed from north to south, are as follows:

- 3rd & Grand northern terminus, on Grand Boulevard at 3rd Street
- City Market on 5th Street at Walnut Street
- River Market West on Delaware Street at Independence Avenue
- North Loop on Main Street at 8th Street
- Financial District on Main Street at 10th Street, adjacent to KCATA transit center
- Financial District South on Main Street at 12th Street
- Convention Center/Power & Light on Main Street at 14th Street
- ♦ Kauffman Center on Main Street at 16th Street
- Crossroads on Main Street at 18th Street
- Freighthouse on Main Street at 20th Street
- Union Station on Main Street opposite Union Station
- Crown Center southern terminus at Pershing Road

The stations would generally of a similar scale as KCATA's MAX stations, with similar and facilities and amenities. The layout and design of a individual stations would be dependent on a number of factors including:

- The location of the stop in the roadway (curbside or median)
- The location of the stop with respect to an intersection (near or far-side)
- The dimensions and configuration of the streetcar vehicle, including presence of doors and ADA boarding locations
- The availability of space (including sidewalk) behind the street curbs and within the right of way
- Station facilities
- The presence or absence of on-street parking at the site of the stop
- Americans with Disabilities Act (ADA) Standards for Accessible Design
- State/local codes and regulations

Minimum platform lengths will need to match the low-floor boarding area from the first door to the last door. The length can vary among streetcar manufacturers, but most stations will require 60 to 70 feet of length. Curbside stations require about eight feet of width and bi-directional median stations require about 10 feet of width. For curbside stations, that width can be provided through curb bulb-outs or through use of the sidewalk. Platform heights are typically 14 inches.



# 7.2.5 Typical Cross Section

Most of the streetcar alignment for the LPA would operate in mixed-traffic, as illustrated a typical type of Cross section in , except for the two terminal locations along Pershing Road and on Grand Boulevard at 3<sup>rd</sup> Street. South of 14<sup>th</sup> Street, service would likely operate in median lanes. Between 14<sup>th</sup> and 9<sup>th</sup> Street, service would likely operate in the curb lane. Initial conceptual designs are presented in the Volume 2 of the Conceptual Alignment Drawings (September 2011).

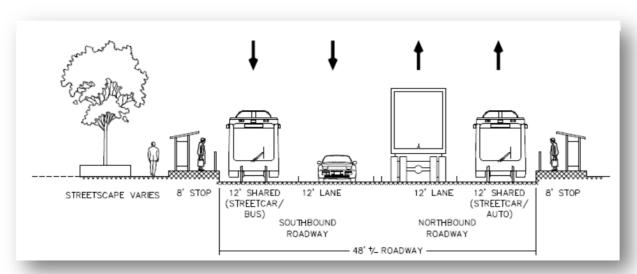


Figure 7-2: Proposed Typical Cross Section - Main Street South of 12th Street

# 7.2.6 Transit Priority

- Transit priority will be used to minimize intersection delays. The types of transit priority that will be used will include:
- Exclusive rights-of-ways at the terminal locations (on Pershing Road and 3<sup>rd</sup> and Grand).
- Transit signal priority at key intersections. Signal priority will be used to hold lights green for approaching streetcars and shorten red times for streetcars stopped at intersections. Signal priority locations that could be used have not yet been defined. These will be defined as the design is advanced.
- Separate signal phases at intersections where streetcars will need to operate across general traffic lanes.

#### 7.2.7 Maintenance Facilities

For the selected Main Street Streetcar Alternative, a Vehicle Maintenance Facility (VMF) will be needed to provide vehicle storage and maintenance services – including vehicle inspection, exterior washing, interior cleaning, repair activities, and spare parts storage. Space for operations and administrative functions would also be included. The facility must accommodate a minimum of five streetcar vehicles (four active vehicles and one spare), based on the preliminary assessment of vehicle requirements for the Main Street Streetcar Alternative. These conceptual requirements will be confirmed in conjunction



with the refinement of the preliminary operations plan, and resulting VMF needs will be updated as appropriate in future stages of project development.

The alternatives analysis process defined the technical requirements of a VMF site and identified a total of sixteen possible sites in the study area that could be considered for a future VMF. Of the sixteen potential sites, only seven exhibited high potential as a future VMF location. This effort primarily served to identify that there are potential sites for a VMF to support the various Streetcar Alternatives. A more exhaustive analysis and study will be required to further evaluate and select a site once the study moves into the advanced conceptual engineering work.

#### 7.2.8 Service Characteristics

Following are the general service characteristics recommended for the LPA. More specific details of the service characteristics will be further defined in the next phases of the study.

Span of Service: Monday through Thursday - 6:00 AM to 12:00 AM; Friday and Saturday - 6:00 AM to 2:00 AM; Sunday - 8:00 AM to 9:00 PM.

Table 7–1: Locally Preferred Alternative Span of Service and Frequencies

Days	Hours	Frequency (mins)
Monday - Thursday	6 AM – 9 PM	11
	9 PM – 12 AM	22
Friday and Saturday	6 AM - 2 AM	11
Sundays	8 AM - 9 PM	22

 Service Frequency: Every 11 minutes; except every 22 minutes from 9:00 PM to 12:00 AM Monday through Thursday and on Sundays

One-way Running Time: 14 minutes

#### 7.2.9 Fare Collection

It was not determined during the AA whether or not fares will be charged. However, if they are, then fare collection would be via ticket purchases from ticket machines onboard the streetcar vehicles.

# 7.3 Basis for Selection of the LPA

As noted in Chapter 4 of the AA Report, the *Kansas City Downtown Corridor Alternatives Analysis* study used a multi-step process to identify a wide range of alignment alternatives, narrow the list to a smaller set of most promising alternatives, and then evaluate the remaining alternatives against a set of evaluation criteria. As is documented in Chapter 4 of the AA Report, the study implemented a 2-Tiered Screening process. Tier 1 Evaluated seven alignment options and recommended carrying two forward for further analysis in the Tier 2 screening process. The Tier 1 Analysis was documented in the "Technical Memorandum: Results of The Tier 1 Screening" dated August 15, 2011.



1 Grand

5 Grand/Walnut

3 Walnut

7 Main/Baltimore

7 Main/Baltimore

Figure 7-3: Tier 1 Alignment Options

# 7.3.1 Tier 1 Evaluation of Alignments

The Tier 1 evaluation process was based on several key principles and assumptions as follows:

- Screening based on 13 criteria that reflect Purpose and Need Statement that included four strategic principles: Connect, Develop, Thrive and Sustain.
- The evaluation criteria were built from these four principles and included qualitative and quantitative elements.
- Seven alignments were examined: four were bi-directional and three were couplets as shown on Figure 7-3, and all alignments were mode-neutral
- Couplet service areas for walking objectives were considered smaller than for bi-directional alternatives (1/4 mile from both directions)
- Couplet service areas for development impact objectives were larger than for bi-directional

alternatives (1/4 mile from either direction)

- Alternatives were given a rating of Best, Good, or Fair for each criteria, and all ratings were relative.
- The Tier 1 Screening is detailed in Chapter 4, and summarized below along with the key findings.

# 7.3.1.1 Objectives Related to "Connect" Principle

- Improve downtown circulation
- Provide connections to major activity centers
- Provide good bicycle and pedestrian connections

#### **Findings**

- Couplet designs serve smaller walking distance and are less intuitive than bi-directional designs
- Alignments that serve 10<sup>th</sup> & Main preferable
- Tradeoff between serving Government District (employment) and the Convention Center/ Kaufmann Center (visitor & special events)
- All alignments offer potentially good bicycle & pedestrian connections.

### 7.3.1.2 Objectives Related to the "Develop" Principle

- Support development and redevelopment
- Increase the number of downtown residents
- Support larger "catalyst" development projects

#### **Findings**

- Couplet designs generally have greater development impact potential due to larger influence area
- All alternatives have good potential to increase the number of downtown residents
- All alternatives have similar potential to impact larger "catalyst" development projects on large parcels
- Two factors account for the minor differences between alternatives:
  - Spatial distribution of vacant parcels (generally cluster in western downtown)
  - Spatial variation of land values (higher in "central" alignments)

#### 7.3.1.3 Objectives Related to the "Thrive" Principle

- Support residential and employment activity downtown
- Support downtown visitors and special events
- Incorporate public and stakeholder input



# **Findings**

- Employment activity more numerous than population
- Employment clustered in east, population in west
- All alternatives serve visitor and special event venues, though Main best
- Main had most public support, Grand second
- Couplets generally less well supported
- Strong support for service to River Market
- Concern about service into Crown Center

#### 7.3.1.4 Objectives Related to the "Sustain" Principle

- Provide efficient and effective transit service
- Provide reliable transit service
- Convert surface parking to higher-value uses
- Consider impacts on utilities

#### **Findings**

- Grand and Main provide best opportunities for efficient and effective transit service
- Couplets have less intuitive service design
- All alternatives relatively similar in ability to provide reliable transit service
- Alternatives utilizing Grand have greater potential to redevelop surface parking
- Grand has lowest impact on utilities
- Couplets have greatest impact on utilities

The conclusion of the Tier 1 Screening resulted in two alternatives rating most favorably, and being recommended for further evaluation in the Tier 2 screening, as described below and illustrated in Figure 7-4 and Figure 7-5.

2 Main Walnut Baltimore Grand/Walnut Main/Walnut Main/Baltimore CONNECT Best Fair Fair Best Goed 120 DEVELOP Best Best Eest THRIVE Fair SUSTAIN SUMMARY Best Best

Figure 7-4: Summary of the Key Findings and Conclusions from the Tier 1 Screening of Alignments

- The **Grand Boulevard Alignment** was rated Best for the following reasons:
  - Close to downtown activity centers
  - Close to employment
  - Integrates well with existing transit service
  - Fewer utility conflicts
  - Strong public and stakeholder support
- ♦ The **Main Street Alignment** was also rated Best for the following reasons:
  - Close to downtown Activity Centers
  - Close to visitor destinations
  - Integrates well with existing transit service
  - Development Potential
  - Strong public and stakeholder support

The results of the Tier 1 Screening are shown in Figure 7-5; the study team recommended carrying the Grand Boulevard and Main Street Alignments into the Tier 2 screening process.



Grand Main Grand

Figure 7-5: Tier 1 Alignment Screening Results

#### Tier 2 Evaluation of Alternatives 7.3.2

The Tier 2 Screening Process was built on the conclusions of the Tier 1 findings and recommendations. The two alignment options were further developed into alignment and mode alternatives. Each alignment was developed to include both an Enhanced Bus Alternative and a modern Streetcar Alternative, as shown in Figure 7-6. The key characteristics of the mode alternatives are shown in Figure 7-7. Figure 7-8 shows the alignments and stop or station locations for the Tier 2 Alternatives.



Figure 7-6: Tier 2 Alignment and Technology Alternatives



Figure 7-7: Key Characteristics of the Tier 2 Streetcar and Enhanced Bus alternatives

Streetcar	Enhanced Bus
Higher capital costs	Lower capital costs
Appeals to choice riders	Not as attractive to choice riders
More comfortable ride	Less comfortable ride
Larger, roomier vehicle	Bus designs are becoming more attractive
Easier to understand and use	• Less easy to understand and use
Bicycles accommodated on-board	Bicycles located on rack in front of bus
More iconic for City	Does not grab attention
Has been shown to spur development	Has less significant impact on development
More visual impacts from wires and tracks	• Less visual impacts
No localized emissions	Localized emissions from buses

The Tier 2 analysis was supported through development of a variety technical analyses, and additional public and stakeholder engagement, including:

#### 1. Definition of Alternatives

- a. Conceptual Engineering / Alignment Maps & Drawings
- b. Basis for design of Streetcar and Bus Alternatives
- c. Maintenance Facility Report
- d. Cost Methodology for Developing the Opinion of Probable Cost
- e. Cost Estimate for Bus and Streetcar Alternatives

#### 2. Tier 2 Screening Technical Analysis

- a. Ridership Methodology and Analysis Memorandum
- b. Economic Development Analysis
- c. Environmental Screening Technical Memorandum
- d. Utilities Memorandum
- e. Traffic Analysis Memorandum
- f. Bikes and Pedestrian Memorandum
- g. Preliminary Finance Plan

#### 3. Documentation of Public and Stakeholder Engagement

- a. Plan for Public and Stakeholder Overview and Approach
- b. Meeting materials used at Public Meetings (available at KCSmartMoves.org)
- c. Summary results from open houses (available at KCSmartMoves.org)
- d. Small collection of most relevant newspaper reporting on the Project





There were several key assumptions in the Tier 2 evaluation of alternatives approach, as follows.

- Walking distances based on ¼-mile buffers
- Economic development based on blocks, not walking distance
- Opening year 2015
- Forecast year 2035
- Household data from US 2010 Census
- Employment data from MARC Travel Demand Model

### 7.3.2.1 "Connect" Evaluation Criteria and Findings

- Connections With Activity Centers: Number of Activity Centers within ¼ Mile of Stations; Activity
  Levels (Employees, Households, Hotel Rooms, etc.) within ¼ Mile of Stations; and Walking Times to
  Activity Centers.
  - Main: Directly serves 10<sup>th</sup> & Main Transit Center, and serves more special event and visitor activity centers.
  - **Grand:** Directly serves the Sprint Center, and better serves the Government District employment center.

Enhanced Bus Streetcar

Figure 7-8: Tier 2 Enhanced Bus and Modern Streetcar Alternatives

Figure 7-9: Activity Levels within ¼ mile: Housing Units, Employees, Hotel Rooms and Special Events

	Main		Grand	
	EB	sc	EB	sc
Housing Units (2010)	3,211	3,211	2,907	2,677
Employees (2005)	47,150	47,150	50,853	50,853
Hotel Rooms (2005)	3,474	3,474	2,469	2,469
Special Event Annual Attendance (2010)	5.7 million	5.7 million	3.3 million	3.3 million

EB = Enhanced Bus, SC = Streetcar

- Assessment of Pedestrian and Bicycle Environment: Review of Pedestrian and Bicycle Connections to/from Stations.
  - Both Main and Grand have generally good and similar walking and bicycling environments



Activity Centers: 13 activity centers as identified in local planning documents; Walk times estimated
using Google Maps; Employment data from Regional Travel Demand Model; Household data from
2010 US Census; Hotel Room data compiled by project team; Special event venues compiled by
project team.

# 7.3.2.2 "Develop" Evaluation Criteria and Findings

- Existing Economic Activity: Population and Housing; Employment; Hotel Rooms; Special Event Venue Attendance; Retail Sales; Corridor Market Value
- Economic Development: Quantitative Assessment, and Qualitative Assessment
  - **Streetcar Alternatives** are expected to induce economic growth over the baseline growth to 2025
  - **Enhanced Bus Alternatives** are not expected to induce significant additional (over base case) economic growth
  - Projected additional growth is higher on Main Street as compared with Grand Boulevard

## 7.3.2.3 "Thrive" Evaluation Criteria and Findings

- Residential and Employment Growth
  - Main: Serves more residents, housing units, hotel rooms; has higher special event attendance
  - **Grand:** Serves greater employment (within ¼ mile)

Figure 7-10: Activity Levels within Station areas of the Tier 2 Alignments



- Transit Reliability
  - Main had no scheduled street closures in 2011
  - Grand had 21 scheduled street closures in 2011
- Public and Stakeholder Input
  - Overwhelming support for **Streetcar** over **Enhanced Bus** at public forums
  - Most liked the simplicity of both alignments
  - Development stakeholders feel short-term market is from residents, downtown visitors and guests; Main Street serves these folks better

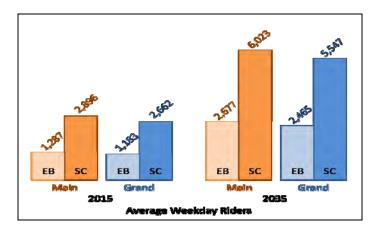


- Main received more numerous and vocal support
- **Grand** received significant opposition from some key stakeholders

## 7.3.2.4 "Sustain" Evaluation Criteria and Findings

- Ridership
  - Streetcar ridership significantly higher than Enhanced Bus
  - Main ridership approximately 9% higher than Grand

Figure 7-11: Estimate of Average Weekday Riders



- Capital and Operating Cost
  - Streetcar capital costs are five times more expensive than Enhanced Bus: \$100 m vs. \$20 m
  - Higher capital costs on Main Street than Grand
  - Streetcar operating costs would be slightly more expensive—higher vehicle and non-vehicle maintenance costs
  - Bus operating costs would not be significantly lower because more vehicles in operation

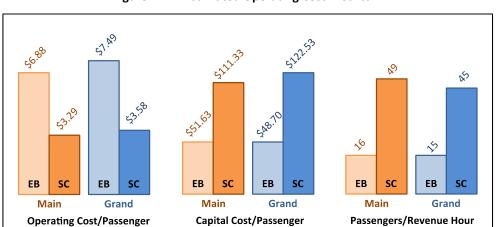


Figure 7-12: Estimated Operating Cost Metrics

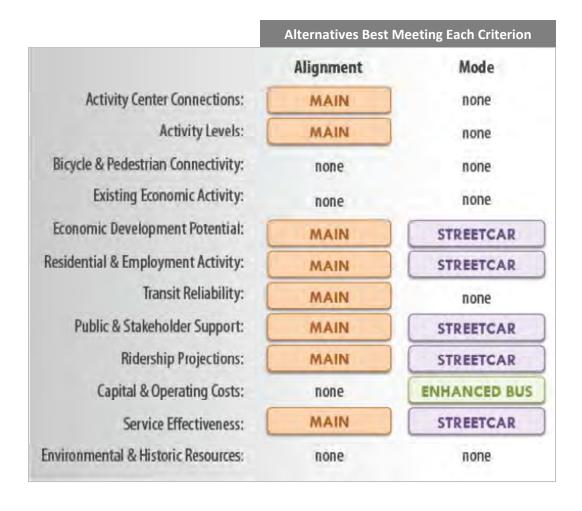






- Environmental and Historic Resources
  - Pre-NEPA analysis indicates no significant impacts or differences between the two alignments

Figure 7-13: Tier 2 Summary Findings and Conclusions



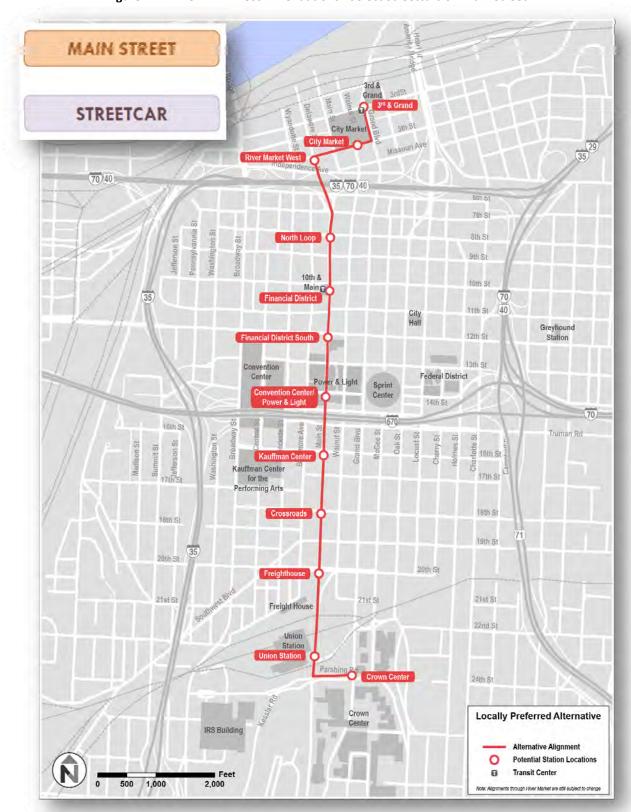


Figure 7-14: Tier 2 LPA Recommendations: Select Streetcars on Main Street









# 7.4 Finance Strategy for the LPA

The consultant team, working in close coordination with City officials, has developed guiding principles and a preliminary financing plan that it recommends for the Locally Preferred Alternative Project. At this point, the financing plan is preliminary, because (1) the costs of the Project will be refined from the initial estimates in this report, (2) stakeholder consultations are only in the early stages and the results of those consultations will very likely impact the specifics of the financing plan. Following is the preliminary finance plan, subject to further refinement.

## **Guiding Principles:**

- No dedicated city-wide sales or property tax
- Fixed rail system creates "permanence" that spurs investment
- No diversion of KCATA funding
- Maximize opportunities for Federal contribution

From the outset of this Alternatives Analysis process, the City has consistently stated its belief that the finance plan must be *downtown-focused* rather than imposed over the City as a whole, in order to be viable under local conditions. City planners and civic leaders have generally accepted the proposition that a downtown circulator constructed with a fixed guideway (such as embedded rails) will not only provide beneficial transit effects, but also (importantly) will provide a sense of permanence that will lead to significant investment and reinvestment in the vicinity of the fixed guideway system. The consultant team, as well as stakeholders and civic leaders, understand that any new system will likely need to be funded substantially by newly created revenue, so that existing levels of transit service are not diminished. Finally, all parties generally agree that aggressive efforts must be undertaken (at the appropriate time) to secure one or more Federal contributions to help pay for the capital cost of the Project.

# 7.4.1 Preliminary Funding Strategy for the Locally Preferred Alternative

In order to create new funding sources that are downtown-focused, the study team recommends that the Project be constructed and financed under the auspices of a Missouri Transportation Development District, or "TDD", formed pursuant to the Missouri Transportation Development District Act, § § 238.200, et seq., RSMo (the "TDD Act"). A TDD is a special benefit district that operates as a separate entity and is a political subdivision of the State, governed by a Board of Directors. A TDD has the statutory power to establish (after the approval of a majority vote of the qualified voters within the TDD) several sources of revenue, that would be generated within the boundaries (and only within the boundaries) of the TDD.

Stakeholders would be asked to agree to the formation of a TDD with boundaries that cover much of the downtown core area. The specific boundaries remain subject to refinement, but the consultant team suggests a district that runs (generally) from the Missouri River on the north to 27th Street on the south, encompassing east to west the bulk of the "River Market" area, all of the property in the "downtown loop" and property south of the downtown loop generally from the centerline of Broadway on the west to the centerline of Locust on the east.



The preliminary capital cost estimate for the Project is just over \$100 Million (as shown in Table 7-1). First year Operation and Maintenance Costs ("O&M") are projected to be approximately \$2.8 Million. In the formulation of this preliminary finance plan, the study team has assumed receipt of \$25 Million in Federal funding assistance, (which we believe to be a reasonable assumption) although Federal funding is not assured. We have also taken into account the expressed intention of the City to provide \$2 Million toward the cost of Advanced Conceptual Engineering. Based on this assumption, the revenue to be generated under the finance plan should (1) support annual debt service on the remaining capital costs of \$73 Million, (2) cover annual O&M costs, and (3) allow for the creation of a reasonable reserve for extraordinary repairs or replacement of equipment.

Table 7-2: Project and Finance Costs

Project Costs (includes aggregate contingency of \$18 Million)	\$ 100,000,000			
City Funding of Advanced Conceptual Engineering	\$ (2,000,000)			
Federal Funding	\$ (25,000,000)			
Net Project cost to Finance* \$ 73,000,000				
*This amount could be reduced as design and engineering proceed further.				

It is anticipated (based on discussions with City officials) that the required local contribution to the capital costs (\$73 Million) would be financed by limited obligation revenue bonds issued by the TDD or another qualified issuer and payable from the TDD's revenue stream pledged to repay such bonds. With respect to such bonds, the annual debt service would vary depending upon many factors, including most particularly the interest rate and the debt service coverage ratio required by the capital markets when the bonds are actually issued.

The City's independent professional financial advisor, First Southwest Company ("First Southwest"), provided guidance for modeling the preliminary finance plan using the following assumptions:

- Issuance of 25-year bonds in April 2013 in an amount necessary to generate a project fund of \$73 Million;
- Additional security for the bonds through an annual appropriation guaranty of the bonds on the part of the City;
- 5.33% true interest cost, with net minimum debt service coverage of 1.25; and
- Capitalized interest through November 2013;
- Debt service reserve fund equal to maximum annual debt service;
- Establishment of a 15% Operating Cost Reserve, funded from TDD revenues; and



<sup>&</sup>lt;sup>11</sup> The Project could also receive up-front or periodic revenue from "naming rights" for vehicles, although we have made no projection of the revenue that could be derived from "naming rights" for vehicles. Revenue from naming rights that is obtained up-front can be used to reduce the capital costs to be financed.

- Periodic growth/decline rates for revenue and expense, as follows:
  - District Sales Tax Increases one percent (1%) annually
  - o Property Assessments Increases two percent (2%) bi-annually
  - o Surface Parking Assessments Decreases two percent (2%) annually
  - o Fares Increases one percent (1%) annually
  - o Ad Revenue No periodic growth
  - O&M Cost- Increases two percent (2%) annually.

Applying the debt service requirements modeled by First Southwest, a number of potential components of revenue that could be generated by a TDD under the TDD Act were identified. The possible revenue sources, at the rates set out in Table 7-2, would provide sufficient revenue to repay the bond financing modeled by First Southwest. The components, and possible rates for each of the components are set out in Table 7-3, which also contains an explanation of the basis for the projected Year One amount of each item of revenue and expense. These numbers are preliminary and subject to change, although the formation and operation of a TDD, and the generation of TDD-derived revenue, is the essence of this preliminary finance plan, and – based on the consultant's review – such a finance plan is legally permissible and financially feasible. It is worth noting that the assumptions underlying the revenue projections do not include any increases in property values or taxable sales that are expected to occur as a result of new development or redevelopment of underutilized parcels.

Table 7–3: Projected Annual Sources of Revenue Through Transit Development District

Special Assessment on Real Property Assessed Value	\$5,140,000	Total projected assessment for 2013. Rates per \$100 AV: Commercial \$0.52, Residential \$0.70, City \$1.04. Special Assessments on commercial property do not apply to market value over \$150,000,000.
One Cent Sales Tax in District	\$3,800,000	Estimated based on aggregate area-wide data provided by KCMO
Special Assessments on Commercial Surface Parking	\$ 730,000	Based on estimate of 4,000 commercial surface parking spaces assessed at \$182.50 per space per year (\$0.50/space/day) - only assesses surface commercial pay lots.
Ridership Fares	\$ 529,000	Year 1 ridership projected to be 2,900 per average day. Assumes fare of \$1.00, but reduced by 50% to account for transfers and possible promotional vouchers. Ridership fares may be inefficient revenue source due to cost of implementing and enforcing
Advertising Revenue	\$ 100,000	
TOTAL	\$ 10,299,000	

It is anticipated that the City and stakeholders will pursue low-cost governmentally-assisted financing for some or all of the costs of the Project, through such programs as TIFIA and/or Missouri's State Infrastructure Bank, among others. Low-cost financing for some or all of the \$73 Million in capital costs expected to be financed could reduce the amount of TDD-derived revenue required for such financing.



Table 7-4: Projected Annual Assessments

Assessment Rate per \$100 of Assessed Value	Commercial \$0.52, Residential \$0.70, City \$1.04
Commercial per \$1 Million of Fair Market Value	\$ 1,664
Residential per \$200 Thousand of Fair Market Value	\$ 267
City per \$1 Million of Fair Market Value	\$ 3,328
Annual City Assessment Payment	\$ 809,979

Based on discussions with City officials, there appears to be support for implementing a financing plan similar to this preliminary finance plan, provided that the City's credit risk is minimized to the satisfaction of the City.

The consultant team recommends that a relatively small working group of major stakeholders be established to pursue a Federal contribution and low-cost governmentally-assisted financing for some or all of the costs of the Project, and that the working group proceed to refine this preliminary financing plan, consistent with the guiding principles set forth at the outset of this section.

# Regional Alternatives Analysis: Downtown Corridor



# Appendix A: Local Agency Actions Adopting the Locally Preferred Alternative

City of Kansas City, Missouri (KCMO)

Mid-America Regional Council (MARC)

Kansas City Area Transportation Authority (KCATA)

## RESOLUTION NO. 110764

Adopting the City's preferred mode and route for a downtown circulator system; an expressing the City Council's continued commitment to regional transit system improvements.

WHEREAS, on December 21, 2010, the Federal Transit Administration awarded the region \$1.8M in federal funding to support the City's downtown circulator study and Jackson County's commuter corridor study; and

WHEREAS, the City received \$540,000.00 of the award to fund an alternatives analysis for its downtown circulator study (the "Downtown Corridor Alternatives Analysis (DCAA)"); and

WHEREAS, the City, working in collaboration with the Mid-America Regional Council, Kansas City Area Transportation Authority and Jackson County, Missouri, selected a consultant team led by HDR to perform the DCAA; and

WHEREAS, the consultant team was tasked with evaluating transit options in a narrow two-mile corridor running from the River Market on the north, through the Central Business District and the Crossroads areas to Union Station and Crown Center on the south; and

WHEREAS, the consultant team evaluated and compared the costs, benefits and impacts of a range of transit alignments and technology alternatives, including modern streetcars, expanded bus and bus rapid transit services, and "no-build" alternatives for defining a starter line for an expandable circulator system; and

WHEREAS, the consultant team's overarching objective was to identify the alternative that would improve corridor accessibility through transit, better connect the City's major activity and employment centers, and elevate the quality and functioning of the region's transit system; and

WHEREAS, the consultant team undertook the DCAA in a manner that included extensive input from the public, stakeholders and local, regional, state and federal agencies; and

WHEREAS, the DCAA considered previous streetcar efforts in the area, including MARC's regional Smart Moves transit plan and ongoing regional planning, including the commuter corridor alternative analysis being led by Jackson County, Missouri; and

WHEREAS, the consultant team has recommend a mode and corridor alignment for the City's consideration; and



## RESOLUTION NO. 110764

WHEREAS, the recommended mode and alignment was carefully and fully considered in the most open manner possible, such that the City Council is confident that it expresses the best alternative to pursue to implementation; and

WHEREAS, the Kansas City Parking and Transportation Commission, at its September 20, 2011, meeting, reviewed the consultant team's report and unanimously agreed to and adopted the recommended mode and corridor alignment; and

WHEREAS, the downtown circulator system is fully expandable and that which is being implemented here will serve as a critical building block for more extensive regional transit system improvements going forward; NOW, THEREFORE;

# BE IT RESOLVED BY THE COUNCIL OF KANSAS CITY:

Section 1. That the recommended mode and corridor alignment – modern streetcars on Main Street – is hereby agreed to and adopted by the City of Kansas City, Missouri.

Section 2. That the City is committed to fully completing the DCAA process in accordance with Federal Transit Administration requirements.

Section 3. That the City reaffirms its commitment to the commuter rail alternative analysis being led by Jackson County, Missouri, which when implemented, will work in conjunction with the downtown circulator to move people to and from their neighborhoods and a variety of activity and employment centers.

Authenticated as Passed

Vickie Thompson-Carr, City Clerk

Sa 201 29 201

Date Passed

Thomason - Carr

#### AGENDA REPORT

#### MARC BUDGET AND PERSONNEL COMMITTEE

January 2011 Item No.

#### ISSUE:

Vote on actions related to Downtown Corridor Alternatives Analysis.

#### BACKGROUND:

In December 2011, TTPC approved the release a proposed amendment to Transportation Outlook 2040 for public review and comment related to the proposed Locally Preferred Alternative (LPA) resulting from the completion of the Downtown Corridor Alternatives Analysis (DCAA). During the January meeting TTPC was asked to consider three related actions in support of the DCAA. These actions were as follows:

1. Acceptance of the Downtown Corridor Alternatives Analysis Report.

The draft report has been made available on the project website, <a href="https://www.kcsmartmoves.org">www.kcsmartmoves.org</a> for public review and comment. Acceptance of the report will allow the project to move the next phase of project planning and development.

2. Amendment of Transportation Outlook as detailed below.

Amend Transportation Outlook 2040 Project #398 "Kansas City Streetcar" to specifically designate this project as the Locally Preferred Alternative (LPA) resulting from the Jackson County/Kansas City Downtown Corridor Alternatives Analysis (AA).

#### Project Details:

- · Project Sponsor: City of Kansas City, Missouri.
- Project Limits: River Market to Union Station/Crown Center
- · Project Alignment: Main Street
- Project Mode: Streetcar
- Project Purpose: The purpose of the project is to provide an attractive transit
  option that will more conveniently connect people and places within the
  Downtown Corridor, and support regional and city efforts to develop downtown
  Kansas City and the Downtown Corridor as a more attractive and successful
  urban center.
- Cost: The estimated capital cost is \$101 million in FY 2011 dollars for construction and approximately \$2.7 million in FY 2011 dollars annually for operations.
- Financial Strategy: The project is proposed to be funded through a combination
  of local and federal funding sources. Proposed local sources include the use of
  the Missouri Transportation Development District Act (TDD) which could include
  a district-wide sales tax and/or district wide property tax assessment. Other
  proposed local revenue sources include surface parking assessments and the
  collection of rider fares and advertising revenues. Potential federal sources
  include TIGER grants, Federal Transit Administration (FTA) Section 5309 New
  Starts funds, Federal formula funds, and Urban Circulator grants.

MARC Staff will review any comments received resulting from the 30-day public comment period, which is scheduled to officially end on January 20<sup>th</sup>.



#### AGENDA REPORT

#### MARC BUDGET AND PERSONNEL COMMITTEE

3. Approve 2012 UPWP amendment #2.

The existing Downtown Corridor Alternatives Analysis task 6.4 in the 2012 UPWP is proposed to be amended to include additional local and federal transit planning funds (\$2m and \$500k respectively) that have been allocated to support the next phase of planning and project development activities. A similar addition has been included in the quarterly TIP amendment that is also scheduled for approval by TTPC and the Board in January.

#### BUDGET CONSIDERATIONS:

None.

#### POLICY CONSIDERATIONS:

Transportation Outlook 2040, as the federally recognized Regional Long Range Transportation Plan, is required to reflect Locally Preferred Alternatives (LPA) that have resulted from AA studies. Inclusion of the Downtown Corridor LPA into Transportation Outlook 2040 will position this project to advance to the next stage of project development and be eligible to compete for Federal Transit Administration grant funding.

#### COMMITTEE ACTION:

Transit Committee recommends approval of LPA as presented. TTPC action is planned for January 17<sup>th</sup>.

#### RECOMMENDATION:

Approve the following actions related to the Downtown Corridor Alternatives Analysis Study:

- a) Acceptance of the Downtown Corridor Alternatives Analysis Report.
- Recommend approval of amendment to Transportation Outlook 2040, contingent on completion of public review and comment period.
- c) Approve 2012 UPWP Amendment #2



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reproportion Kansas City's: Kange Transportation Plan

2040 > About > Amendment Procedures



### Amending the Plan

Opportunities for public involvement in regional transportation planning do not stop with the adoption of the long-range transportation plan. Transportation Outlook 2040 will continue to evolve as additional needs are identified. Assendments may be made to the plan as projects are modified, or as new projects, funding, programs or transportation legislation arise. In addition, MARC is federally required to complete a major update of the long-range transportation plan at least every five years.

Tom Gerend, Assistant Director of Transportation

816/474-4240

Mid-America Regional Council, 600 Broadway, Suite 200, Kansas City, MO 64105

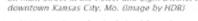
#### Amendment No. 1: Designate Project #398 Kansas City Streetcar as Locally Preferred Alternative

Approved by the MARC Board of Directors 1/24/2012

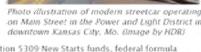
MARC has amended Project #598 Kansas City Streetcar as the locally preferred alternative osseiting from the Kansas City Downtown Corndor Alternatives Analysis,

- . Sponsor Canalis City, Ma.
- Eimits: River Market to Union Station: Crown Center.
- · Alignment Man Street
- · Book Micelan
- · Purpose: Provide an attractive transit option that will more conveniently connect people and places within the Downtown Corridor, and support regional and city efforts to develop downtown Kansas City and the Downtown Corridor as a more attractive and successful
- Cost: The estimated capital cost is \$101 million in fiscal year 2011 dollars for construction and approximately \$2.7 million in fiscal year 2011 dollars annually for operations
- Emancial Strategy: The project is proposed to be funded through a combination of local and federal funding sources. Proposed local sources include the use of the Missouri Transportation Development District Act, which could include a district-wide sales tax and/or district-wide property tax assessment. Other proposed local revenue sources include surface parking assessments and the collection of rider fares and advertising revenues. Potential federal sources include TIGER grants, Federal Transit Administration Section 5309 New Starts funds, federal formula funds, and Urban Circulator grants.

on Main Street in the Power and Light District in downtown Kansas City, Mo. Omage by HDRI









Review study website: www.kcsmartmoves.org/projects/downtowncorndor.aspx







#### RESOLUTION

SUPPORTING A MODERN STREETCAR ON MAIN STREET AS THE LOCALLY PREFRRED ALTERNATIVE FOR KANSAS CITY, MISSOURI'S DOWNTOWN CORRIDOR, REVISION OF THE REGION'S LONG RANGE TRANSPORTATION PLAN, AND AUTHORIZING FEDERAL FUNDING FOR THE STREETCAR PROJECT.

WHEREAS, the City, KCATA, MARC and Jackson County formed a partnership team to complete an Alternatives Analysis (the "Analysis") to study transit alternatives in the area of Kansas City, Missouri between the River Market and Crown Center (the "Downtown Corridor");

WHEREAS, federal Alternatives Analysis funding and City local match funds were used by the partnership team to conduct the Analysis in 2011;

WHEREAS, on September 29, 2011, the City Council of Kansas City, Missouri, approved Resolution No. 110764 designating a modern streetcar along Main Street as (the "Streetcar Project") the City's preferred transit alternative for the Downtown Corridor;

WHEREAS, the City intends to continue with implementation of the Streetcar Project by undertaking Advanced Conceptual Engineering ("ACE") which will include the refinement of the existing conceptual engineering, environmental analyses and financial planning for the Streetcar Project; and

WHEREAS, KCATA supports the City actions to implement the Streetear Project and intends to cooperate with the City in the completion of the ACE work on the Streetear Project.

#### NOW, THEREFORE, BE IT RESOLVED THAT:

- The KCATA has determined that the Streetear Project is the preferred alternative for transit in the Downtown Corridor.
- The region's long range transportation plan be revised by MARC to indicate that the Streetcar Project is the locally preferred alternative for the Downtown Corridor.
- The KCATA will become the recipient of an FTA Section 5307 grant that includes the \$500,000 for the ACE work to be matched with \$125,000 in local City funds.
- The KCATA staff is hereby authorized to file the aforementioned Section 5307 grant application and take such additional actions necessary to effectuate the purpose of this resolution.

See attached page for notarial continuate.

17953501v3



# Regional Alternatives Analysis: Downtown Corridor

This page belongs with a resolution by the KEATA Board of Commissioners regarding support of a modern streetear on Main Street. KANSAS CITY AREA TRANSPORTATION AUTHORITY By: Name: M Title: General Manage dey of Robring, 2012 Subscribed and sworn to before me this Notary Public My Commission Expires: CHERYL D. FLOYD My Commission Expires 11-26-14 November 26, 2014 Clay County Commission #10392497 Approved as to form. LATHROP & GAGE L.C. Attorneys for the Kansas City Area Transportation Authority Name: Jerry Riffel General Counsel 17953501/1

Volume 1: Conceptual Engineering Technical Documents

# Downtown Corridor Alternatives Analysis







MODERN STREETCAR

**ENHANCED BUS** 

# Volume 1: Conceptual Engineering Technical Documents

SEPTEMBER 16, 2011



Prepared By – HDR Engineering, Inc.



HR

#### <u>Final Conceptual Engineering Documents</u>

The conceptual engineering and analysis for the Kansas City, MO. Downtown Circulator Alternatives Analysis is now complete. Several alternatives were considered in both Tier 1 and Tier 2 screening of the analysis including four alignments and two modes. As a final deliverable, HDR Engineering, Inc. has complied the engineering documents into two volumes. Volume 1 includes all the engineering technical documents that were created and used during the evaluation of the alternatives. Volume 2, includes the conceptual engineering documents which document the station locations and key cost components used to develop the opinion of probale costs. The following includes a brief discription of the contents in each Volume and appendices.

#### **Volume 1 – Conceptual Engineering Technical Documents**

**Appendix A – Basis of Design Report/Technical Memorandum** – This report serves as the basis for the entire engineering evaluation. It documents the basic design assumptions for each of the modes and describes the general characteristics assumed for the alternatives.

**Appendix B – Maintenance Facility Siting Technical Memorandum** – This memorandum documents the conceptual level evaluation of possible sites for a maintenance and storage facility.

**Appendix C – Utility Identification Summary** – This is a summary of a preliminary utility investigation which was used to establish the potential utility infrastructure that could be encountered and may have to be dealt with during future phases of project development.

**Appendix D – Cost Methodology for Developing the Opinion of Probable Costs** – This memorandum sumerizes the overall methodology and apporach used in developing the opinion of probable costs for both the bus and streetcar alternatives.

Appendix E – KCMO Downtown Circulator AA – Opinion of Probable Cost Summary – This memorandum is summary of the final capital cost estimates developed for the project. It includes a breakdown of the major cost components as well as the detailed estimates developed for the project.

#### **Volume 2 – Conceptual Engineering Drawings**

Volume 2 includes the conceptual engineering drawings for both the streetcar and bus alternatives considered during the tier 2 screening process. It includes both plan view and general typical sections for each alternative. It should be considered conceptual in nature with the primary purpose of documenting the key cost compenents used to develope the opinion of probable costs for the project.



# **Appendix A**



**Basis of Design Report/Technical Memorandum** 









# Basis of Design Report/ Technical Memorandum

Prepared by:

HDR
HDR Engineering, Inc.

Prepared for:



Date:

7/22/2011

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### 1 INTRODUCTION

### 1.1 Purpose and Scope

The purpose of this Basis of Design Report is to establish general assumptions that will serve as the basis for the engineering evaluation and capital costs estimates to be developed during the Tier 2 screening of alternatives. The material contained herein is intended to provide a clear understanding of the basic design assumptions being used for this study.

The design assumptions contained in this report include assumptions for both the streetcar and bus alternatives. However, the majority of this report is focused on defining the streetcar assumptions since many design elements are only affected by or pertinent to the streetcar alternatives. The streetcar exclusive sections include sections 2, 3, 6, 7, and 8. Section 1, 4, and 5 discusses many common issues that apply to both modal alternatives.

In general, the design assumptions for the bus alternatives will follow the same standards used for the existing MAX BRT design except station spacing. The assumptions for the streetcar alternatives are based on industry best practices for projects similar in nature to the KCMO Downtown Circulator. They represent the "typical" characteristics of a urban circulator and include some of the unique challenges of implementing a system in a built downtown environment. These general guidelines are intended to support the planning process and serve as a general framework for establishing more detailed guidelines during preliminary engineering and final design.

This document has been reviewed by MARC, KCMO and KCATA. All comments received have been addressed and/or incorporated in this final version of the basis of design report.

### 1.2 Other Projects.

There are several planned future projects and studies that take affect some or all of the Downtown Corridor Alternatives Analysis study area. During the process of alternatives evaluation, it is important to consider how these projects and studies may impact the feasibility and/or costs of each alternative. As of July 2011, the following are MAJOR projects and/or studies within in the Downtown Corridor study area that should be considered as part of this study:

- Grand Blvd Streetscape project Currently Grand Boulevard is being studied for possible streetscape improvements. These improvements could include widening sidewalks, adding bike facilities and modifying the existing traffic configuration. If Grand Blvd is further considered to advance into Tier 2 screening and/or becomes the locally preferred alignment, close coordination and collaboration will be required between the two project teams.
- Jackson County Commuter Corridors Alternatives Analysis This project does not share an
  alignment with the downtown circulator and is completely independent, serving commuters
  from outer suburbs. However, the downtown circulator, if built, would complement the
  commuter rail project in providing circulation in the downtown business district. As both
  projects move forward, there should be ongoing coordination and discussions to ensure
  passengers of one system can easily access and use the other.





KCATA's Comprehensive Services Analysis – The Comprehensive Service Analysis (CSA) applies
to the public transit service provided by KCATA. It will be used on an ongoing basis to evaluate,
adjust and improve transit service as demand and conditions change.

### 1.3 Potential Operational Constraints – Street Closures

There are many events, festivals, concerts, etc. that occur in downtown Kansas City that could have an impact on the operations of the alternatives along many of the alignments being considered. It is relatively common for some of the streets in downtown to be closed during larger events. There are two types of closures that are typical in the corridor. One is a partial-day closure to help control pedestrian circulation to large events held at the Sprint Center. The street is only shut down during the event and for a short duration before and after. The other type of closure is a full-day closure. Some of these last for several days at a time (multiday) and are typically reserved for events where there are activities, displays, stages, etc. set up in the street. The following are brief characteristics of these two event types.

### Partial day closure:

- Typically for concerts or large events at the Sprint Center.
- Closures occur starting about 1 hour prior to the event and last until it is deemed safe to open the street to traffic again, typically around 2 hours after the event is finished. For a 3 hour event, the closure would last for approximately 6 hours +/-.
- The street is blocked off with bollards, barricades or police officers.
- No automobile traffic is allowed in the closed area, only pedestrians.
- KCATA buses are rerouted to adjacent, parallel streets during the closure.

### Full day closure:

- Typically for large events where displays, exhibits, tents, etc. are set up in the street.
- Many full day closures last more than one day.
- The street is closed off using bollards.
- No automobile traffic is allowed in the closed area, only pedestrians.
- KCATA buses are rerouted to adjacent, parallel streets during the closure.

To better understand the magnitude and locations of the closures, the design team attended a downtown events and street closure meeting held on June 2nd, 2011. At this meeting, information was requested from the various stakeholders to identify their events including location and duration. To date, only the Sprint Center provided any specific feedback. In addition to the Sprint Center response, HDR was able to obtain a monthly calendar listing ALL street closures and their location for a 6 month period from March 1st of 2011 through August 31st 2011. A copy of these calendars has been included as Attachment A to this document. Based on these calendars and conversations with staff at the City, it appears that special events are limited to 2 of the 4 tier 1 alignments being considered for the project. Neither Main Street nor Baltimore Avenue appear to have any regular occurring events that need to be considered as part of this study. Grand Boulevard and Walnut Street both have events in which the streets are subject to closures (primarily between Truman Rd. and 13<sup>th</sup> Street). Table 1.1 provides a summary of the number of partial and full day street closures that occur on the Tier 1 alignments in the corridor. These numbers are based off the calendars mentioned previously.





Table 1.1 – Special Event Street Closures from March through August 2011

Street Name	Partial Day Closure (6+/- hours) for concerts/events	Full Day Closure (Total days closed)	Total Days a Closure Occurs
Grand Boulevard	5	16	21
Main Street	0	0	0
Walnut Street	0	7	7
Baltimore Avenue	0	0	0

For both Grand Boulevard and Walnut Street, the street closures present a challenge that would have to be addressed in future phases of project development should either of these alignments move forward into design. There are many alternative ways to handle these conflicts, such as adjustments to the event/closure and/or modifications to the streetcar and bus operations.

For the Purpose of this study, HDR will assume that the streetcar alternative will have to be capable of operating as a single track for some events. This means including two crossovers and signaling/communications to control the single track operation. An allowance will be added for the Grand & Walnut streetcar alternatives. It is assumed that the bus alternative could be rerouted during special events without any significant cost.

### 1.4 Streetcar/Bus Technology Description

### For Streetcar Alternatives -

Streetcar technology considered suitable for this project will have the following characteristics:

- Single unit low-floor vehicles with articulated sections to navigate tight curves
- Electrical propulsion motors
- Steel wheels that run along steel rails
- Power generally drawn from an overhead catenary wire and/or from an onboard battery
- Travel along both city streets (mixed-traffic) and dedicated rights-of-way with street crossings (semi-exclusive right-of-way)
- Must be available in North America and meet "Buy America" and minimum US specifications for Light Rail/Streetcar vehicles prescribed by federal requirements
- Minimum specifications:
  - Minimum curve radii: 20 Meters (65.6 ft)
  - Maximum achievable grade: 9%
  - Operating voltage 750 Volts
  - Level boarding height: ~14 inches
  - Maximum axle load 26 kips
  - Length: 20M 25M (66 82 ft)

There are at least three current streetcar technologies being offered in the US that meet these minimum specifications. Additional information and general arrangements of these three vehicles can be found in Attachment B.

- United Streetcar 100 or 200
- Kinkisharyo AmeriTram
- Siemens Ultrashort S70 (Note Max grade for Siemens may be less than 9%)





### For Bus Alternatives -

Bus technology assumed for any of the bus alternatives will generally be consistent with the existing MAX BRT buses. They would be similarly equipped and possibly branded specifically as the downtown circulator route separate from MAX as shown in figure 1 below.



Figure 1 – Existing MAX bus assumed for bus alternatives

### 1.5 Project Goals

The primary goal of an urban circulator project is to provide passengers with the benefits of improved public transportation service in a safe, cost-effective, environmentally sensitive, and socially responsible manner. To this end, the following policies shall be adhered to:

- **Proven hardware** The streetcar and/or bus system shall be designed to use proven, "off the shelf" subsystems, hardware and design concepts.
- Design life The system's fixed facilities (structures and buildings) shall be designed for
  continued operation over a minimum period of 50 years before complete refurbishment and
  renovations are necessary due to wear and tear and obsolescence. Vehicles and equipment
  shall be designed for a minimum of 30 years for a streetcar and 12 years for a bus before
  complete replacement becomes necessary.
- **Service integration** The circulator route is to be part of the overall local and regional transportation system. Specific provisions shall be made for the efficient interchange of passengers with private and other public transportation modes.
- Minimal impact The system should strive to remain on existing streets, affecting only the
  portion of the roadway within existing curb lines as much as possible. The streetcar alternatives
  should avoid reconstruction of entire roadways and streetscapes, and try to take advantage of
  concurrent projects or city plans to "piggyback" on such projects where possible. A minimal
  impact approach reduces project costs, environmental effects, and construction durations.
- Land use The circulator system should be designed, where possible, to stimulate urban
  development and redevelopment while avoiding drastic changes that disrupt the public
  commerce or social interaction. Creation of physical barriers to land use functions and
  reduction in traffic circulation capacity shall be avoided to the extent it is practicable to do so.





Urban design - The design of the circulator system shall consider the viewpoint of the user, the
adjacent residential or business community, and the nearby pedestrian or motorist. System
design elements (trackway, stations, etc) should minimize, to the maximum extent possible,
impacts to environmental, cultural, historic, and social resources and shall match the existing
aesthetics/context of the surrounding area as much as possible.

### 1.6 General Assumptions

There are a few general assumptions to be made that affect the basis of design for this project.

- **Bus alternatives are assumed to** share similar station design features and vehicle type as the existing MAX BRT.
- Station spacing will be similar for both the streetcar and bus alternatives.
- Vehicles will be controlled by the Operator from the cab of the vehicle. The Operator must obey traffic signals and transit signals, and will operate by line-of-sight in other areas. The Operator will also be in phone/radio contact with an Operations Control Supervisor.
- Vehicles that operate within existing street alignments are assumed to have a maximum operating speed that matches the posted speed limit of the roadway.
- Fare policy and collection are policy issues that must be set by KCMO and KCATA. For the purpose of this study, it will be assumed that a ticket vending machine (TVM) will be onboard the vehicle. However, other options exist such as providing TVMs on stop platforms. The final selection of fare collection should be made during future stages of project development. Regardless of fare collection method ultimately selected, it should be designed to avoid impact to the overall operation and run times of the system. If on-vehicle ticketing is used, it should be implemented with TVM's and based on the honor system, not at the door and/or verified by the operator as currently done on the KCATA bus system.
- The streetcar is assumed to use a specific vehicle maintenance and storage facility (VMF)
  designed for the streetcar system. A separate technical memorandum will be provided which
  evaluates and identifies potential and suitable sites for a VMF which serves the potential
  alignments being considered.
- Streetcars will utilize a DC power system at 750V of overhead power. Streetcars shall be capable of operating at 40mph sustained operating speed. Streetcar vehicles will produce acceleration rates of 3 mph per second, and will utilize dynamic braking and to produce a braking rate of 3 mph per second.

### 2 ALIGNMENT & TRACK

### 2.1 Track Alignment

Streetcar track alignment, geometry, clearances, and track type are typically established during the advanced conceptual/preliminary engineering based on the following inputs:

- Physical operating environment of the system (urban, in-street, etc)
- Type of streetcar vehicle desired
- Design guidance and reference to local and national standards.

The streetcar system will generally operate in an urban, in-street environment. The benefit of an instreet alignment is a minimal amount of construction, challenging designers to "fit" the system into existing roadway rights-of-way. Most, if not all, streetcar vehicles available are designed to run in this type of track environment.





The track alignment for an urban, in-street system will generally follow standards and specifications established by the local rail operating agency and rail transit industry standard practice documents and specifications. City standards and specifications should also be used during the design process, as they provide a familiar source of design details and specifications that can aid designers and contractors. The list of industry standard practice documents includes, but is not limited to:

- AREMA Manual for Railway Engineering and Portfolio of Track Work Plans;
- TCRP Report 57 "The Track Design Handbook for Light Rail Transit"
- APTA Guidelines for Design of Rapid Transit Facilities

Where alignments are proposed within existing street lanes or rights-of-way, the track alignment should be designed to match the posted speed of the roadway. The City and KCATA should agree on locations where the track alignment design limits the operating speed to be less than the roadway posted speed limit. These should be clearly justified and agreed to by the City and KCATA. Typical design speeds for tangent and curved track are given below:

- Tangent track Posted speed (+/- 30 MPH)
- Lane shift through intersection Approximately 15 MPH
- 90 degree turn Approximately 5-10 MPH

### 2.2 Track Type

The type of rail and track construction utilized on a streetcar system is influenced by the alignment and/or street environment of the proposed project. Alignments that run in streets shall use an embedded trackway, one with rails flush with the ground surface and an exposed flangeway gap. Other alignments that run off street can utilize other types of track, such as ballast on tie or direct fixation, depending on the specific nature of the location. Rail type can be tee rail or grooved rail, again dependent on the nature of the alignment and availability of rail types. Other factors such as the amount of bicycle traffic, large trucks and pedestrians should be considered in the rail selection. It is not in the scope of this study to evaluate and establish the rail and track type. The initial streetcar project and each subsequent project shall evaluate both types of rail during preliminary engineering and provide advantages/disadvantages of all rail types, along with a recommendation and strategy for design, procurement, and construction. Figure 2 illustrates tee rail with a formed flangeway and Figure 3 illustrates a grooved rail with a steel flangeway included as part of the rail.



Figure 2 - Tee Rail with concrete flangeway



Figure 3 - Grooved rail with steel flangeway

There are many variations and architectural treatments such as stamped and colored track slabs or brick inlays that could be considered, however these treatments will add to the overall project costs. For the





purpose of this study, it will be assumed that the streetcar track is a simple embedded track slab with a finished concrete surface as shown in **Figure 4** below.



Figure 4 - Simple concrete track slab

### 2.3 Design Criteria

In general, the following design criteria will be used to develop streetcar alignments at a conceptual level:

- Track gauge = 4'-8 ½" (distance between inner and outer rail)
- Track slab width = 8 feet
- Minimum travel lane width streetcar in mixed traffic = 11 feet
- Minimum parking lane width = 8 feet
- Minimum bike lane width = 5 feet
- Horizontal tangents shall be used in areas of special trackwork (turnouts, crossovers, etc) and station platforms.
  - Minimum horizontal tangent beyond station platform = 20 feet
  - Minimum horizontal tangent between curves = 40 feet desirable, 0 feet min.
  - Minimum horizontal tangent between switches = 10 feet
- Minimum vertical tangent beyond station platform = 15 feet
- Minimum vertical tangent between curves = 0 feet
- Minimum vertical tangent before switches = 10 feet
- Maximum gap between platform and edge of streetcar door = 3 inches (ADA)
- Minimum design horizontal curve radius = 66 feet (82' desirable)
- Maximum design grade = 9%; 2% at stations (or match existing street grade)
- Minimum design vertical curve = 820 feet (radius)
- Minimum design spiral length (assuming no superelevation) = 25 feet
- Minimum OCS wire height = 18 feet for mixed traffic; 14 feet for exclusive guideway (19ft Std.) based on codes and physical limitations of the vehicle.

### 3 ROADWAY

### 3.1 Effects on Roadway

The effects of streetcar construction and operation on the adjacent roadway network are designed to be minimal. As described above, streetcar trackway slabs are 8 feet wide and can be placed within existing





travel lanes without shifting traffic. The track designer will consider existing roadway geometry (curves, intersections, and cross section) when laying out the streetcar's horizontal alignment and vertical profile. By following the existing physical features of the roadway, streetcar trackways avoid major reconstruction of the remaining lanes, curbs, sidewalks, driveways, and access ramps. This method of avoiding reconstruction also allows existing drainage patterns to be maintained, further reducing costs by eliminating the need to reconstruct catch basin inlets and other drainage facilities. **Figure 5** illustrates track slab installation into an existing travel lane.



Figure 5 - Track installation in existing travel lane

### 3.2 Roadway Cross Section

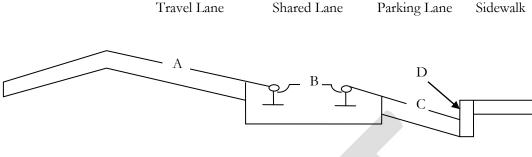
Track slabs are designed to provide a flat (0%) slope between the rails. Any slope greater than 0% between the rails in tangent track, or reverse superelevation in curved sections, is undesirable and can result in uneven rail and wheel wear. A level (0% cross-slope) slab should be used between rails for all tangent track except in highly restrictive grading situations where some cross-slope (a maximum of 1%, with agency approval) may be required to accommodate existing roadway cross-slopes. The track slab can accommodate 1.5-foot 'wings' outside of the rails that vary in slope (0% to 5%) to accommodate for the overall (or "effective") cross slope of the existing roadway.

As described above, the track design will attempt to limit roadway reconstruction to only that required for the construction of the track and installation of relocated utilities. **Figure 6** illustrates the approach for defining the limits of roadway reconstruction.





Figure 6 - Approach to roadway track slab roadway grading



	Desirable	Maximum	Minimum
A	2%	5% or Match Existing	1% or Match Existing
В	0%	1%	0%
С	2-4%	7% or Match Existing	1% or Match Existing
D	6-8 inches	10 inches	4 inches

In some installations, the entire roadway surface is treated in some manner to enhance the overall benefit of the streetcar and leave the adjacent paved roadway surface in a much-improved state. If reconstruction of the entire roadway is required, the cross slopes presented in the above graphic can be improved upon to achieve more desirable values.

### 3.3 Lane Selection

When selecting the lane to place a streetcar trackway, several factors affect the decision-making process. Existing and future traffic volumes, presence of existing utilities, presence of bicycle lanes and on-street parking, and desired station configuration all influence the lane selection of streetcar tracks on a multi-lane street. A "best lane" study will help to determine the alignment early in the planning and design phase, which can then be refined once an alignment is selected. Examples of typical streetcar stop configurations with side and median (center) stops are shown in **Figure 7** through **Figure 9**.







Figure 7 - Mid-Block center platform



Figure 8 - Nearside side platform separate from sidewalk (occupying parking lane)

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Figure 9 - Nearside side platform with shared sidewalk (occupying parking lane)

### 4 STATION STOPS/FOOTPRINT

Stations (or stops) can be one of the most defining elements of a transit system. Although specific design guidance and criteria will be provided in later project phases, this section describes the basic civil engineering criteria to be used in the preliminary design of stops associated with the streetcar or bus alternatives and will serve as the basis of the cost estimate for this study.

### 4.1 Stop Design

The layout and design of a stop will be dependent upon a number of factors including:

- location of the stop in the roadway (curb-side or median)
- location of the stop with respect to an intersection (near or far-side)
- dimensions and configuration of the streetcar/bus vehicle, including presence of doors and ADA boarding locations
- availability of space (including sidewalk) behind the street curbs and with-in the right of way
- type of shelter (if desired/required) to be provided at a stop
- presence or absence of on-street parking at the site of the stop
- Americans with Disabilities Act (ADA) Standards for Accessible Design
- State/local codes and regulations.

### 4.2 Dimensions of Stop

For the streetcar alternatives, the length of the stop can only be assumed in early project phases because it is dependent upon the location of the doors on the streetcar vehicle. The minimum length of the platform should match the low-floor boarding area of the streetcar between doors. Since that length can vary among streetcar manufacturers, KCMO and KCATA have the luxury of establishing criteria for platform lengths that accommodate parking and access to the stop. Most curb extension side stops are bulb outs occupying existing parking spaces. Theses stops require approximately 60-70





feet to provide a minimum of 40 feet of tangent (boarding area) and 20-30 feet to transition the "bulb out" curb extension back to the existing curb line. This results in the loss of approximately three parallel parking spaces. It is recommended that a minimum of 60-70 feet be allotted for streetcar side stops, which allows ample space for a boarding platform, access ramps, and a basic level of amenities at the stop.

The width of the streetcar stop is dependent on a number of factors:

- Type of stop median or sidewalk, single or dual-direction
- ADA accessible route and boarding area
- Type of canopy/shelter and other amenities, if desired

In early stages of project planning, the width of the streetcar stop can be assumed based on typical location characteristics and adjusted during later stages of design. For these early stages, a width of 8 feet for sidewalk stops and 10 feet for median stops (serving a single direction) is a reasonable assumption. **Figure 10** below shows an example of a side station stop and station elements:

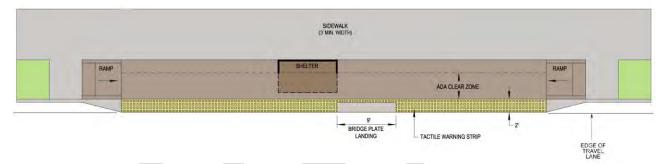


Figure 10 - Station Stop without Parking; Sidewalk behind Shelter

For the bus alternatives, the design of the stops is simplified as buses are able to "swing" into the stop and avoid bulb outs, work with standard curb heights and do not need to be as long since the vehicle is shorter. As stated previously, the assumptions for the bus alternatives is that they will be configured and designed similarly to the existing max stops and priced accordingly.

Consideration should also be given to share stops between streetcars and buses where practical. There may be parallel bus routes which remain in place and can, where practical, share a stop with the streetcar. If stops are to be combined there are some issues that will have to be addressed during preliminary engineering and final design. For example, the typical curb height at a streetcar stop is 14 inches for level boarding. The taller curb height may not be compatible with the existing ADA lift equipment on the existing bus fleet and will have to be evaluated in future phases of design.

### 4.3 Stop Shelter and Amenities

The presence and type of canopies/shelters at stops shall be evaluated once a list of stops has been generated, typically during project planning and preliminary engineering design. The influence of external factors, such as limited width or shelter provided by existing canopies, buildings, or trees can affect the design and location of shelters. A variety of commercially available shelters that could be used on a circulator system. These shelters can be enclosed or freestanding. Similarly, KCMO and KCATA could choose to design and construct shelters rather than installing pre-fabricated ones. For the





purpose of this study, shelters will be assumed to be similar to the existing MAX shelters as shown in **Figure 11** below.

In addition to a shelter, the stops will be assumed to include other amenities such as additional benches, trash receptacles, leaning/guard rails where appropriate and a "Next Streetcar/Bus" display which indicates the arrival time of the next streetcar/bus.



Figure 11 – Existing MAX stop shelter

### 4.4 Stop Locations, Bicycle Lanes, and Parking

Placement of stops must consider other uses of the roadway - traffic conditions, bicyclists, parking, and pedestrians. Streetcar vehicles are designed with low floor doors on both sides of the vehicles, allowing the system flexibility to have right- or left-side boarding. The location of the track within the roadway often follows desired stop placement; the location of stops and the location of track are interdependent and are designed and tested against each other during preliminary engineering. Curb side stops are typically proposed when the following conditions are encountered:

- Single track on the roadway (in a couplet track or single track operation)
- Heavy left-turn volumes from the corridor to cross streets are present
- Narrow roadway width (too narrow for median stop); or a wide roadway with multiple lanes in each direction
- Side stop would enhance pedestrian activity and streetscape
- Parallel parking adjacent to curb can be removed for a streetcar stop 'bulb-out'

In addition, if the streetcar track is located on a one-way street, a left-side curbside stop may be desirable when the right lane moves slower due to on-street parking or when a bicycle lane is present. Median stops are typically proposed when the following conditions are encountered:

- Bicycle lane and/or heavy bicycle traffic would be impeded by a curbside stop.
- Dual streetcar tracks (one in each direction) with ample space in between for a median stop
- Parallel parking or other curb-side features that cannot be removed





None of the current alignment alternatives have existing bike lanes. However, if future plans call for one, a detailed study and appropriate design approach should be developed to safely integrate bikes into the overall design and stop configuration. This is particularly important for a side running streetcar adjacent to a bike lane. A common treatment is to make the stop an "island" and provide a bike bypass lane approximately 6" below (grade separated) the stop as shown in **Figure 12.** 

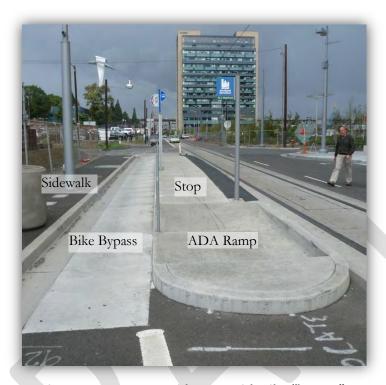


Figure 12 – Streetcar Side Stop with Bike "bypass"

There are significant safety concerns combining buses with cyclists and pedestrians as well. Though the bus does not have a "flangeway" (groove in the pavement adjacent to the rail) that poses a vaulting hazard to cyclists when crossing, the buses, where they cross bike paths can be an equally hazardous. Regardless of mode; careful planning, design and coordination with the bike and pedestrian community throughout the project development will result in a more comprehensive design and safer operating environment for all users of the public's right of way.

### 5 TRAFFIC DESIGN/OPERATIONS

This section establishes the basis for engineering criteria to be used in the design of a downtown circulator system. It includes requirements for traffic control devices and criteria for the design of the traffic signal systems, signing, and pavement marking as they apply to interfacing the streetcar and/or bus alternatives within the street network.

### 5.1 Applicable Codes

Traffic vehicle and pedestrian signals, signs, and markings shall be in accordance with the applicable State and City traffic guidelines and with the *Manual on Uniform Traffic Control Devices* (MUTCD) published by the US Department of Transportation (USDOT).

Materials and equipment used in each installation and/or modification of traffic signal systems, signing, and paving markings shall conform to the latest specifications contained in the standards of the City.





### 5.2 General Design Criteria

Where streetcar/buses operate in a lane of traffic, the shared lane shall be at least as wide as the static outline of the vehicle, but no less than 11 feet without prior approval from the City. If the streetcar/bus operate in a semi-exclusive guideway, it shall be delineated or physically separated from parallel auto traffic on that street. It is expected that the majority of the project will be a mixed traffic operation.

Guideways and passenger station stops shall be designed to minimize interference with pedestrian or bicycle movements. Where pedestrians and/or bikes must cross the guideway, appropriate crossing angles and signage shall be provided to minimize the potential of vaulting. Where a pedestrian and/or bike crossing is part of a signalized street intersection, control shall be provided by means of standard vehicle, pedestrian, and/or bike traffic signals. At other locations, at the direction of the City or KCATA, these devices may be supplemented by passive signs, active signs, flashing beacons, or any combination thereof. **Figure 13** below illustrates an active PTW (part time warning) sign that flashes "TRAIN" to alert motorists of the presence of a streetcar entering the intersection. These types of signs are typically only used where the streetcar is accomplishing a transit only maneuver or there are a high number of instances of autos violating traffic signal indications (i.e. running red lights) and the PTWs are added for safety.



Figure 13 – Active Part Time Warning (PTW) sign

### 5.3 Traffic Signals

Most of the existing traffic signals along the corridor alternatives are on pole-mounted mast arms over the travel lanes. For the streetcar alternatives, some modification may need to be made to the pole locations and mast arms, depending upon the location of the trackway and stations within the roadway. If or where the streetcar system is designed to operate "wirelessly" and no overhead trolley wire is needed, there will be fewer impacts to the existing traffic signal equipment than with wires. This is due to the required maintenance clearance around the wire, if used. During future stages of design, actual





clearances to traffic signals and appurtenances would have to be determined based on OSHA and other regulating bodies.

In several existing urban streetcar installations, it is common to use some of the signal poles jointly with OCS (Overhead Contact System). This practice can reduce the number of poles needed within the ROW and reduce sidewalk "clutter" and the overall costs of the project. For the purposes of the conceptual engineering cost estimate, it will be assumed that the OCS will use joint-use poles (see **Figure 14**) as much as possible.



Figure 14 - Joint-use Traffic signal and OCS pole

### 5.4 Traffic Operations and Signal Priority

The number of phases for traffic signals along the route will generally be dictated by the number of phases in the existing condition. Where the streetcar/bus operates in mixed flow in the existing traffic lane, streetcar/bus movements will be controlled by normal traffic signal operations. At locations where the streetcar/bus transitions into or out of special lanes, special transit-only signals may be provided. Transit signals will be physically separated from the traffic signals and use transit-only display indications consistent with the MUTCD. **Figure 15** shows a traffic signal pole with both auto and "transit" signal heads.







Figure 15 – Traffic signal with both auto and transit signal heads

To increase efficiency and improve runtimes, KCMO and KCATA may choose to implement transit signal priority (TSP) for various intersections along the corridor. TSP comes in various forms including full-preemption and partial priority.

Full pre-emption is where the signal is triggered to turned green regardless of the point in the signal cycle which the traffic controller receives a call from the operator/vehicle. Full – preemption for transit typically requires the traffic signal to be given the precise time at which the streetcar/bus is going to enter the intersection in order to be effective and limit the effect on auto capacity. Given the streetcar/bus typically operate in mixed traffic and travel time may vary due to congestion, pedestrians, cars parking, etc., full pre-emption is not a good fit. It is not being considered for this project.

Partial priority is a much better fit for a streetcar/circulator bus type of operation. It is less disruptive to the auto traffic, doesn't require precise timing of the vehicle and has been used on many streetcar/bus systems across the US. Partial priority provides priority to the streetcar some of time (I.e. partial) by extending green time or truncating the red phase to minimize the delay of the streetcar/bus. The major difference between partial and full priority is that the streetcar/bus will still have to stop at some red lights with partial priority. In order to reap the benefits of TSP, the traffic signals and streetcar/bus vehicles must have compatible equipment installed so the streetcar operator can send an indication to the traffic signal controller that the vehicles is approaching the intersection and requests priority. Depending on the current phase, the signal may extend the green and allow the streetcar to proceed without stopping or truncate the red and minimize the delay. Existing signals in the study corridor may already be equipped with Opticom or other preemption equipment which would minimize the capital costs associated with employing partial priority TSP. During preliminary engineering, the existing traffic controllers and equipment will have to be evaluated and upgraded as necessary to provide priority.

For the Purpose of this study, HDR will assume that the streetcar/bus system will be designed with partial priority TSP. HDR will, to some extent, be able to get an indication of the existing traffic signal equipment and understanding of the level of effort required to upgrade the signals to provide TSP. An allowance will be added to the capital cost estimate for TSP.





### 5.5 Streetcar/Bus Operating plan

For both modal alternatives, a conceptual operating plan will be developed to illustrate how the streetcar/bus alternatives complete their service. The streetcar vehicles are assumed to be double ended with operating cabs at both ends. This allows the streetcar to terminate at a tail track where the operator switches control from one end (cab) to the other and operates the vehicle in "reverse" for the opposing direction (i.e. SB instead of NB). The bus alternatives will likely have to "loop" around a block in order to switch from a north bound to a south bound trip (or visa versa). These variations could have a slight impact to the overall run time of one alternative versus another and affect the operating costs.

The proposed headway is likely the biggest and most important variable that needs to be documented and assumed for either modal alternative. The selected headway is a factor in the number of vehicles required, has an impact the operating costs and number of riders and can have an effect on the overall capacity of the transportation network. For the purpose of this study and developing operating cost and ridership estimates, a 10-minute headway will be assumed for both the bus and streetcar alternatives.

Operating costs will be based on national and regional averages based on vehicle revenue hour or revenue track miles and sufficient for comparative purposes. Detailed estimates and operating costs will have to be developed once a preferred alternative is selected and further detailed out during preliminary engineering and final design.

### 6 UTILITIES

Impacts to existing utilities are an important consideration when selecting streetcar routes and trackway locations. Streetcars, as with other urban rail transit systems, pose challenges to utility companies by limiting the access to facilities in close proximity to the trackway (both above and below ground), and by the potential for stray current to trace to metallic pipes buried in the ground along the alignment. The impacts can be classified by the following:

- Underground utility lies parallel and directly beneath proposed trackway, affecting access and stray current;
- Underground utility lies parallel and offset from proposed trackway, requiring analysis of access and stray current;
- Underground utility lies perpendicular to proposed trackway, and at a shallow depth, requiring
  offset of stray current and sleeving requirements
- Underground utility lies perpendicular to proposed trackway, at a deep depth, possibly impacting access
- Overhead utility directly over or in close proximity to trackway, affecting clearance of the trolley wire and OCS pole locations.

For early analysis purposes, existing "major" utilities will be located using GIS base maps and other available information to determine their presence in a proposed streetcar alignment. No determination will be made at this time as to their specific location in the roadway; specific locations (vertical and horizontal) should be located early in the design phase and may result in modification of track and/or stop locations to avoid costly utility relocations. Major utilities are generally defined as follows:

• Water and sewer: 10" pipe and larger

Storm drain: 24" pipe and larger

• Gas: 4" transmission pipes and larger





 Dry utilities (cable, electric, fiber optic, telephone): Duct banks and major transmission lines, vaults

For the purpose of this study, the potential alignments will be evaluated for the approximate level (low, medium or high) of impacts anticipated. An allowance will be included in the cost estimate appropriate to the level of impact anticipated based on GIS and as-built information readily available and provided by utility companies.

### 7 STRUCTURES

There are several existing structures on the potential alignments being considered for this study. The streetcar vehicle loading is less than HS-20 loading which most bridges are designed to. However, in order to install the rail on the existing structures and have the pavement flush with the top of rail, some additional dead load may be added to the structure. The additional dead load, in combination with the HS-20 (auto) loading, is usually the determining factor when evaluating adding streetcar to an existing bridge structure. The following existing bridge structures are along one of the potential tier 1 alignments:

- Main Street over Kansas City Terminal Railway (City of Kansas City)
- Main Street Crossing over I-670 (MoDOT)
- Main/Delaware over I-70 (MoDOT)
- Walnut Street over I-70 (MoDOT)
- Walnut Street over I-670 (MoDOT)
- Grand Blvd Over I-70 (MoDOT)
- Grand Blvd Over I-670 (MoDOT)
- Grand Blvd Over Kansas City Terminal Railway and surface street to the north (City of Kansas City)
- Baltimore Ave Over I-670 (MoDOT)

In order to understand the feasibility and potential costs associated with crossing these existing structures, the consultant team is conducting an initial screening and high level analysis. This is documented in a technical memorandum and included in Attachment C.

### 8 TRACTION POWER SYSTEM

### 8.1 Traction Power Substation

Streetcar systems are powered by a traction power supply system (TPSS) via a network of traction power substations and overhead and underground wires. The systems are designed to run off a 750 Vdc power which comes from the local power utility as AC power that is converted to suit the needs of the streetcar TPSS. The AC source power is transformed to the appropriate voltage and converted to DC using transformers and rectifiers at the substation location. Multiple TPSS are located along the alignment, with spacing dependent on the choice of low power or high power substations. Low power (less than 500 kW, 480Vac) substations are typically suited for lower-speed systems, such as urban streetcar applications. They are spaced about twice as close (about 1 per half mile) as high-power, and are less expensive to implement due to lower capital costs. Often, underground TPSS duct banks can be eliminated or minimized using this method since the substations are spaced close enough that the voltage drop between them stays within the tolerable operating range. High power (above 500kW, 12.5 to 15kV) substations are spaced around one per mile of double track and can use either overhead or underground feeder systems. During preliminary engineering, the traction power and systems design





consultant should prepare a load-flow analysis considering both options and present the recommendation for the alignment.

The substations can be housed in either pre-fabricated (less expensive) or specially designed buildings. These substations can have a visual impact – higher power substations are larger than low power substations. The aesthetics of substations can be mitigated by using façades (i.e. brick, etc) or landscaping. Also, for the low powered units, there are some substations which are small enough to fit into a single parking space and can be placed in an inconspicuous location in an adjacent parking structure. Depending on the availability of locations and visual requirements, substations can vary in cost, and additional options (such as architectural treatments) can increase the price. An example of a pre-fabricated substation (low-power) and an ultra compact substation capable of fitting into a single parking stall are shown in **Figure 16** and **Figure 17** respectively.



Figure 16 – Pre-fabricated substation (low-power) for the Portland Streetcar





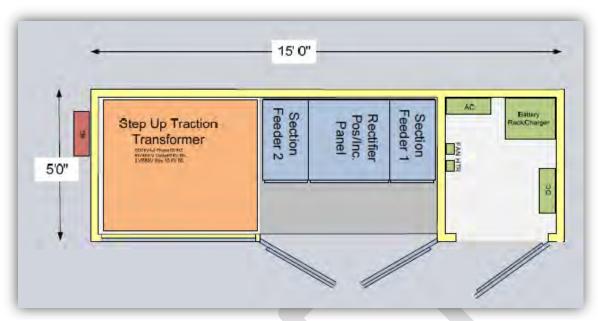


Figure 17 – Ultra compact substation (low-power) – fits in one parking stall

Elements of the substation are typically designed once certain features of the system have been decided: the vehicle, operational frequency, and potential for future system expansion.

For the purpose of this study, it will be assumed that low power substations spaced approximately ½ mile apart (double track) will be used. Further, substations are assumed to be pre-fabricated units or ultra compact units installed without any architectural treatments in an adjacent parking garage or other inconspicuous location.

### 8.2 Traction Power Distribution

Distribution of the DC power occurs via feeder wires and overhead wire, to be collected by the vehicle's pantograph. There are two design options for the OCS: single contact wire (trolley wire), which can be fed underground or simple catenary with overhead feeder, common of higher speed LRT. The choice of distribution can have an effect on visual impacts to the corridor. A single contact wire (**Figure 18**) is a single wire option used on systems with lower operating speeds in urban environments, in conjunction with power substations that are closely spaced. This is designed for lower-speed streetcar projects and should be considered the default traction power distribution system until later stages of project development prove otherwise. Normal catenary (**Figure 19**) uses two wires under tension, one messenger that supports a contact wire, to distribute power, requiring a cantilevered arm. This is typically used with high power substations on systems with higher operating speeds. Minimum clearances from OCS wires are set by AREMA NFPA, IEEE, and OSHA. Areas of concern include proximity to overhead structures above the roadway, other overhead utilities, traffic signals, light fixtures and the maintenance of structures.







Figure 18 – Single contact wire OCS



Figure 19 – Catenary OCS



Alternatives Analysis Design Assumptions Report



Pole choice can be determined by aesthetic criteria. They can be simple or ornamental, designed to match existing infrastructure or combined with traffic signals or light poles (as discussed in the traffic section) to reduce pole clutter. Additionally, span wire affixed to building facades can reduce visual impact in areas where cantilever arms are required.

For the purpose of this study, it will be assumed that a single trolley wire system is employed using enhanced or decorative poles. It is also assumed that, where practical, traffic signal and light poles will be used as much as possible to minimize the pole clutter and reduce costs.

### 8.3 Stray Current and Corrosion Control

Current returns to the substation to complete the circuit via the embedded running rails in the street. Because of this, certain precautions must be taken to avoid stray current and corrosion. To avoid material degradation for both system elements and underground utilities, the primary method of stray current control is to isolate the running rails. This is accomplished in embedded trackwork by placing the rail in a rubber boot, or by placing any special trackwork in elastomeric grout. Testing is performed on a regular basis to ensure the path is continuous. Secondary control, if desired, can occur by placing reinforcing steel in the track slab that is electrically continuous, by positioning testing facilities along the tracks, by monitoring the TPSS, and by using cathodic protection for facilities such as metallic water lines along the track.



### Attachment A – Street Closure Calendars



## MARCH 2011 EVENTS CALENDAR

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
CC - Convention Center Events SC-Sprint Center AR-American Royal MT-Midaland Theatre KA - Kemper Arena KC REP- Repertory Theatre P&L-Power Light KC Live! Block Kauffman Stadium City Street Closures		1 CC - Kansas City International Auto Show KC REP-Circle Mirror Transformation (till 20 <sup>th</sup> )	2 CC - Kansas City International Auto Show	3 CC -Mid-American Intercollegiate Athletics Assn (5,000), Kansas City Auto Show (fil 6) MT - Joe Bonamassa	4 CC-Mid-American Intercollegiate Athletics Assn (5,000), Kansas City Atto Show (till 6) Dave Ramscy Entreleadership, Dance America Dance Contest Union Station - Diana A Celebration (till June 12)	S CC -Mid-American Intercollegiate Athletics Assn (5,000), Kansas City Auto Show (ill) 6, Dance America Dance Contest SC-Nuclear Cowboyz AR-Dave Ramsey Total Money Makeover KC Live! Block -Mardi Gras Festival
6 CC- Mid-American Intercollegiate Athletics Assn. (5,000), Kansas City Auto Show (ill 6) SP-Rascal Flatts	٢	8 C.C. Big 12 Women's (10,000)	9 CC- Big 12 Women's (10,000) SP-Big 12 Men's 18,500 KC Livel Block –Baskethall Fan Fest, Vertical Horizon Concert	10 CC. Big 12 Women's (10,000), Kris Kristofferson & Merle Haggard SP - Big 12 Men's (18,500) KC Live! Block - Basketball Fan Fest	11 CC. Big 12 Women's (10,000), Mercum Auto Auction, SP -Big 12 Men's (18,500) KC Livel Block -Basketball Fan Fest	12 CC- Big 12 Women's (10,000), Mercum Auto Auction, Move Productions Dance Competition, Bright Future Internship Program SP-Big 12 Men's (18,500) MT-Red State USA Tour KC Live! Block -Basketball Fan Fest
	City Street Closures Grand closed between Truman and 13 <sup>th</sup> 14 <sup>th</sup> Closed between Grand and Wahuut Closed Between 13 <sup>th</sup> and Truman	City Street Closures Grand closed between Truman and 13 <sup>th</sup> 14 <sup>th</sup> Closed between Grand and Walnut Walnut Closed Between 13 <sup>th</sup> and Truman	City Street Closures Grand closed between Truman and 13 <sup>th</sup> 14 <sup>th</sup> Closed between Grand and Walnut Walnut Closed Between 13 <sup>th</sup> and Truman	City Street Closures Grand closed between Truman and 13 <sup>th</sup> 14 <sup>th</sup> Closed between Grand and Walnut Walnut Closed Between 13 <sup>th</sup> and Truman	City Street Closures Grand closed between Truman and 13 <sup>th</sup> 14 <sup>th</sup> Closed between Grand and Walnut Walnut Closed Between 13 <sup>th</sup> and Truman	City Street Closures Grand closed between Truman and 13 <sup>th</sup> 14 <sup>th</sup> Closed between Grand and Walnut Walnut Closed Between 13 <sup>th</sup> and Truman
13 CC. Big 12 Women's (10,000), Move Productions Dance Competition, MT – Disney Imagination Movers	14	15 Westin-Wildlife Management Inst.(1,400) SP-WWE Smackdown TV	16 CC.NAIA Men's Basketball (8,000) Westin-Wildlife Management Inst.(1,400)	17 St. Paricks Day Parade CC.NAIA Men's Basketball (8,000), American String Teachers Asn (1,000) Inst(1,400) KC Live! Block -St. Patrick's Day Festival	18 CC.NAIA Men's Basketball (8,000), American String Teachers Assn (1,000) Westin-vildlife Management Inst(1,400) KC REP-Cabaret (till April 10)	19 CC-NAIA Men's Baskethall (8,000),Amer Assn of Neuroscience Nurses (1,500), American String Teachers Assn (1,000) MT-DeVotchKa
20 CC.NAIA Men's Baskethall (8,000),Amer Assn. of Neuroscience Nurses (1,500) AR-Great Train Expo	21 CC-NAIA Men's Basketball (8,000),Amer Asm. of Neuroscience Nurses (1,500) <b>Hyatt-</b> Dairy Farmers Of America	CC-NAIA Men's Baskethall (8.000),Amer Assn. of Neuroscience Nurses (1,500) Hyatt-Dairy Famers Of America	23 SC – DOI Toy Story 3 Hyatt-Dairy Farmers Of America	24 SC - DOI Toy Story 3	CC.Mary Kay (2,000), Greater Kansas City Home Show (till 27th), Revolution Tabant Contest (Till 27th), HBA Spring Flower, Lawn & Garden Show, COA Cheer & Dance SC.—DOI Toy Story 3 MT-Lewis Black	26 CC-Mary Kay (2,000), Greater Kansas City Hone Show (till 27th), Revolution Talent Contest (Till 27th), HBA Spring Flower, Lawn & Garden Show, COA Cheer & Dance SC- DOI Toy Story 3 AR-MOPACA Invitational Alpaca Show
CC. Greater Kansas City Home Show (till 27th), Revolution Talent Contest (Till 27th), HBA Spring Flower, Lavn & Garden Show, CoA Cheer & Dance MT-Drake Bell SC- DOI Toy Story 3 AR-MOPACA Invitational Alpaca Show	28	29	30 CC – Mark Zinnnerman Tradeshow	31 CC-Natl Conventions & Trainings (5,000) till 4 <sup>th</sup> , 2011 Spring Nationals Kauffman – Angels vs. Royals	VisitKC.com can be your complete online resource for convention groups, special events and all other activities. If you have questions or would like additional copies contract Betry Buettgenbach at 816-221-5242 or buettgenbach@visitkc.com.  The Kansas City Convention & Visitors Association has made every effort to provide accurate information in this guide.	resource for convention groups, you have questions or would like bach at 816-221-5242 or s Association has made every effort guide.

# APRIL 2011 EVENTS CALENDAR

SUNDAY	MONDAY	A	APRIL 2011 EVENTS CALENDAR WEDNESDAY	NDAK THURSDAY	FRIDAY	SATURDAY
VisiRCom can be your complet Kansas City Convention & Vi	ViviRC.com can be your complete online resource for convention groups, special events and all other activities. If you have questions or would like additional copies contact Betty Buettgenbach at 816-221-5242 or bbuettgenbach@visitkc.com. The Kansas City Convention & Visitors Association has made every effort to provide accurate information in this guide.	ps, special events and all other activiti. effort to provide accurate informa	es. If you have questions or would lifon in this guide.	like additional copies contact Betty But	ctgenbach at 816-221-5242 or <b>bbuet</b> t	genbach@visitkc.com. The
CC-Convention Center Events SC-Sprint Ce Kauffman - Stadium City Street Closures: Ongoing: KCREP- Cabaret (Apr. 10) Union Station - Diana A Celebration (Jun. 12)	CC-Convention Center Events SC-Sprint Center AR-American Royal MT-Midland Theatre KA Kauffman - Stadium City Street Closures: Ongoing: KCREP- Cabaret (Apr. 10) Union Station - Diana A Celebration (Jun. 12)	I and the second	Kemper Arena KC REP. Repertory Theatre P&LPower Light KC Livel Block	Power Light KC Live! Block	1 CC-Natl. Conventions & Trainings (5,000), 2011 Spring Nationals MT-Bill Cosby KC REP- Cabaret (till 10 <sup>th</sup> ) Kauffman – LAA vs. Royals	CC-Natl. Conventions & Trainings (5.00), 2011 Spring Nationals, KC Rollers, Berty Buckley: For the love of Broadway MT-Three Days Grace SC-PR KC Livel - Kevin Fowler Kauffman - L.AA vs. Royals Radisson (KC1-Professional Photographers of Anner, Inc. (1,000) City Street Closures Grand Blvd. 13th o Truman Grand Blvd. 13th o Truman 14th Street Walmut to Grand
3 SC-PBR Kauffman – LAA vs. Royals City Street Closures: Grand Blvd. 13th to Truman 14th Street Walmut to Grand	4 CC Natl, Head Start Assn. (3,000)	5 CC Natl. Head Start Assn. (3,000), West Side Story West Univ of MO, School of Denistry(3,700) Kauffman – CWS vs. Royals	6 CC-Natl. Head Start Assn. (3,000), West Side Story Hyatt-Univ of MO, School of Denistry(3,700), Kauffman – CWS vs. Royals	7 CC-Natl. Head Start Assn. (3,000), West Side Story <b>Hyatt-</b> Univ of MO, School of Dentistry(3,700),	8 CC-Natl. Head Start Assn. (3,000), West Side Story, Talent on Parade Dance Competition Hyatt. Univ of MO, School of Dentistry (3,700) MT-Coheed and Cambria City Market – Earth Day Events	CC. West Side Story, Talent on Parade Dance Competition, A Night of Hope, Under the Big Top, West Side Story SC-Iowa Barnstormers vs. COMMAN OF Hyatt Univ of MO, School of Dentstry(3.700),
10 CC- West Side Story, Talent on Parade Dance Competition Hyart. Univ of MO, School of Denistry (3.700), City Market - Community Yard Sale, Broadway Bridge Run	UCC- Talent on Parade Dance CC- Competition Hyatt- Univ of MO, School of Dentistry(3.700),	12 SC-Rod Stewart & Stevie Nicks	13 C.C Shen Yun Performing Arts HyattNatl. Agn-Warketing Assn.(1,200, 80% fty in, All meals planned)	14 CC-CMAA Hyatt-Natl. Agri-Marketing Assn.(1,200, 80% fty in, All meals planned) Kauffman – SEA vs. Royals	15 C.C.St. Teresa's Prom, Masquerade Dance Competition Hyatr. Natl. Agri-Marketing Assn.(1.200, 80% fly in, All meals planned Kauffman – S.E.A vs. Royals MT-Glenn Beck	16 CC-USA Volleyball(7,000, on own for meds, parking alerto Marquerade Dance Competition, U.S. Firins Cheerleading Competition, U.S. Firins Cheerleading Competition, Midwest Marional Volleyball Qualifier MT-Giggle with Gilda SC-Arizona Ratters vs. COMMAN, W.D. Kauffman – SEA vs. Royals City Market – Knock Kneed Sally Band AR-Kansas City Pet Expo
CC-USA Volleyball (7,000, on own for meals, parking alert) Masquerade Dance Competition Mid-West National Volleyball Qualifier, Kauffman – SEA vs. Royals	18 CC-USA Volleyball (7,000, on own for meals, parking alert) Mid-West National Volleyball Qualifier Kauffman – CLE vs. Royals	19 Kauffman – CLE vs. Royals	20 Kauffman – CLE vs. Royals MT-Sick Puppies	21 Kauffman – CLE vs. Royals	CC-USA Volleyball (7,000, on own for meals, parking aler) Mid-West National Volleyball Qualifier, J.C. Harmon School Prom KC-Peer Gynt (Till May 22)	23 CC-USA Volleyball (7,000, on own for meals, parking alert), Rock Culture Con, JAMfest MT-Pretty Lights
24 CC-USA Volleyball (7,000, on own for meals, parking alert) Midwest National Volleyball Qualifier	25 CC-FBI-KC Div. (2000, On own for Dinner)	26 CC-FBI-KC Div. (2000, On own for Dinner)	27 CC-FBI-KC Div. (2000 Dinner meal planned)	28 CC-FBI-KC Div. (2000, On own for Dimer). Forks & Corks, Build Construction Career Day Arrowhead - Chiefs 2011 Draft Day Party	CC-Primetime Dance MT-The Color Purple SC-Dallas Vigilantes vs. COMMAND Kauffman -MIN vs. Royals	CC-Primetime Dance, Belton High School Prom, Staley High School Prom Sp. Jimmy Buffett Kauffman - MIN Wr. Royals MT-The Color Purple Arrowhead-CureSearch Walk for Children's Cancer City Street Closures; Grand closed between 13th - 14th

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SUNDAY	MONDAY	TUESDAY	MAY 2011 EVENTS CALENDAR WEDNESDAY	DAR	FRIDAY	SATURDAY
CC-Convention Center Events SC City Street Closures - Parking Ale	CC-Convention Center Events SC-Sprint Center AR-American Royal MT-Midland Theatre KA City Sireet Closures - Barking Aleri		na KCREP. Repertory Theatre P&L.	- Kemper Arena KCREP. Repertory Theatre P&L-Power Light Kauffman Stadium - Union Station/ Crown Center, City Market	on Station/ Crown Center, City Market	
Ongoing: Union Station – Diana A Celebration (Jun. 12) KC -Peer Gynt (Till May 22) City Street Closures: Broadway Closed 13 <sup>th</sup> to 16th May-Sept	on (Jun. 12) osed 13 <sup>th</sup> to 16th May-Sepi					
1 CC-Primetime Dance, World Changers Church, Third Day Male Your Move Tour KC-Peer Gynt (Till May 22) Kauffman – MIN vs. Royals	2 MT-Jay & Silent Bob Get Old	3 CC-Collegiate Strength & Conditioning Coaches Assn., Rock of Ages MT-Godsmack Kauffman – BAL vs. Royals	4 CC-Collegiate Strength & Conditioning Coaches Assn., Rock of Ages Kauffman – BAL vs. Royals	5 CC-Collegiate Strength & Conditioning Coaches Assn., Rock of Ages P&L-Cinco De Mayo with Making MT-The Moody Blues SC-Bob Seger Kauffman - BAL vs. Royals	6 CC-Collegiate Strength & Conditioning Coaches Assn., Rock of Ages P&L-Downtown is Happy Kauffman - OAK vs. Royals	7 CC. Rock of Ages, Roller Warriors, Truman High School Prom City Market – Flower Power P&LDerby Fest SC-New Orlens Voodoo vs. COMMAND Kauffman – OAK vs. Royals Parking Meri
8 CC- Rock of Ages, Intimacy Tour, World Changers Church International, KEM Kauffman – OAK vs. Royals Parting Alver	6	10 CC-US Dept. of Energy (2000, 80% fly-in) Union Station-KCCVA Annual Meting P&L-KC Royals Viewing Party	11 CC-US Dept. of Energy (2000, 80% fty-in, Available for Lunch, Dinner) P&L-KC Royals Viewing Party MT-The Rise Against Bad Religion SC-Cirque du Soleli: Dralion	12 CC-US Dept. of Energy (2000, 80% fly-in, Available for Lunch, Dinner) SC-Cirque du Soleii: Draiton P&L-Justin Moore in Concert	13 SC-Cirque du Soleli: Dralion P &L-Rock the Block Fashion Show, Downlown is Happy. Crown Coetter – Flesta Kansas City MT-Afentra's Prom Parking Aker	14 CC-Liberty High School Prom, Rockhurst University Graduation MT-Diddy Dirty Money SC-Cirque du Soleil: Drailion Crown Center – Fiesta Kansas City LIBERTY MEMORIAL-ROCKFEST PARGIN MAIN
CC-Park Hill High School Graduation, Rockhurst High School Graduation, St. Teresa's Academy Graduation, St. Teresa's Academy Graduation, World Changers Church International City Market - Reckless Abandon SC-Cirque du Soleit: Dralion Crown Center - Fiesta Kansas City, Jiggle Jam Friking Aleri	16 BIKE WEEK Kauffman – CLE vs. Royals	17 Kauffman – CLE vs. Royals	18 CC-Futurallia (500, 80% fly in, open for dinner), Oak Park High School Graduation Kauffman – TEX vs. Royals	19 CC-Futurallia (1,000, all meals planned), Metropolitan Community College Graduation, 15th Annual Business Opportunity Fair MT-Tommy Emmanual Band Kauffman – TEX vs. Royals, Tourism Day at the K	20 CC-Futurallia (1,000, all meals planned), NKC High School Graduation Graduation RAL-Downtown Art Annual, Downtown is Happy. Kauffman – STL vs. Royals City Street Closures – Grand Closed between 13 <sup>th</sup> –14 <sup>th</sup> street & Walmut Closed between 13 & 15th Earking Alex	21 KA - Blue Valley Graduations CC-Diane's School of Dance, Liberty High School Graduation P&L-Downtown Art Annual, Family Fun Days Crown Center - Heart of America Jaguar Concour of Elegancw MT-WBFF Central US Championships Kauffman - STL vs. Royals Parking Meet
KA – Blue Valley Graduations CC-Kansas City Missouri School District Graduation, World Changers Church International City Market – Jeremy Nichols Band RAuffman – STL vs. Royals Farking Alert	25 CC-Kansas City Missouri School District Graduation	24 CC-Christian & Missionary Alliance (5,000, 45% air, 53% ear, 2% andor coach, on own for meals, Kansas City Missouri School District Graduation, Entrepreneur Workshop	25 CC-Christian & Missionary Alliance (5,000, 45% air, 53% car, 2% anotor coach, on own for meals), Kansas City Missouri School District Graduation SC-Josh Groban City Street Closures-Grand Closed between 13 <sup>m</sup> -14 <sup>a</sup> street Parking Albert	26 CC-Christian & Missionary Alliance (5,000, 45% air, 53% car, 2% motor coach, on own for meals, UMC School of Medicine Graduation Parking Aler	CC. Christian & Missionary Alliance (5,000, 45% air, 53% car, 2% motor coach, on own for meals, ETS (500, all meals planned, 95% fby in) P&L-Downtown is Happy. Parking-Mert	28 CC- Christian & Missionary Alliance (5,000, 45% air, 53% car, 2% andro coach, on own for meals), Miler-Marley School of Dance Recital, ETS (3500, all meals planned, 95% ff vin) MT-Widespread Panic SC-Spokane Shock vs. COMMAND Crown Center-Jiggle Jam Parking Aler
CC-Christian & Missionary Alliance (5,000, 45% air, 53% car, 2% motor coach, parking alert, on own for meals), Miller Marley School of Dance Recital, Blue Spring High School Graduation, ETS (350), all meals planned, 95% ff y in) Union Station – Bank of America Celebration at the Station Crown Center – Jiggle Jam Farking Alter	30 CC-ETS (3500, all meals planned, 95% fly in) MT-Gay Fieri Road Show Kauffman – L.AA vs. Royals	CC- ETS (3500, all meals planned, 95% fly in), Get Motivated Seninars SCGet Motivated Seminars Kauffman – LAA vs. Royals City Street Closures – Grand Closed between 13 <sup>th</sup> –14 <sup>th</sup> street Barking Alei	ViitkC.am can be your complete online resous contact Betry Buengenbach at 816-221-5242 or provide accurate information in this guide.	VialKC.anw can be your complete online resource for convention groups, special events and all other activities. If you have questions or would like additional copies contact Betry Buetgenbach at 816-221-5242 or <b>bluettgenbach@visilkc.com</b> . The Kansas City Convention & Visitors Association has made every effort to provide accurate information in this guide.	nts and all other activities. If you have quest. Kansas City Convention & Visitors Ass.	ions or would like additional copies ociation has made every effort to

## JUNE 2011 EVENTS CALENDAR

CC-Convention Center Events SC-Sprint Center AR-American Royal MT-Midland Theatre KA – Kemper Arena KC REP. Repertory Theatre P&L-Power Light Union Station/Crown Center/Destination Crown Center, City Market, Arrowhead City Street Closures - Balance Market Market Market Convention Groups and all other activities. If you have questions or would like additional copies contact Berry Buetrgenhach at 816-221-5242 or burettgenhach@visitke.com. The Kansas City Convention & Visitors Association has made every effort to provide accurate information in this guide.

Ongoing: Union Station – Diana A Celebration, Every Bride A Princess (Jun. 12) City Street Closures: Brondway Closed May-Sept. 14 <sup>th</sup> to 15 <sup>th</sup>	Every Bride A Princess (Jun. 12) seed May-Sept. 14 <sup>th</sup> to 15 <sup>th</sup>		1 CC- ETS (3500, all meals planned, 95% fly in)	2 CC- ETS (3500, all meals planned, 95% fly in) P&L-Downtown Hoedown with Clay	3 CC- ETS (3500, all meats planned, 95% fly in) City Market - Buzz Under the Stars with Mutord P&L- Downtown is Happy, Pride Fest	4 CC- ETS (3500, all ments planned, 95% fly in), Roller Warriors City Market – Farm to Table Celebration P&L-Pride Fest Crown Center – Hospital Hill Run SC-Chiranon Ruch ve COMMAND
S City Market – Art of the Machine Car Series CC- ETS (3500, all meals planed 25% fly in) World Changers Church International P&L. Pride Fest	6 CC. ETS (3500, all meals planned, 95% fly in), Perseila School of Dance Recital MT-Steigh Bells & Neon Indian	7 CC- ETS (3500, all meals planned, 95% fly in)	8 CC- ETS (3500, all meals planned, 95% fly in)	9 CC_ETS (3500, all meals planned, 95% fty in) AR-Kids Agricultural Learning Fest P&L-Hot Country Nights	10 CC- ETS (3500, all meals planned, 95% fly in) P&L- Downtown is Happy. Wine Fest. Friday Live Concert Series Grand Blyd. will close Friday, June 10 (10:00 AM) - Monday, June 13 (3:00 AM)	CC. ETS (3500, all meals planned, 95% fly in). Caruthers Dance Studio Recital City Market Blind Date City Market Blind Date Downtown Airport – 7th Annual Base Ball Crown Center- Antique Festival SC-Street League P&L Wine Feet. City Street Closures – Grand Closed between 13th–14th street Feet.
City Market – Art of the Machine Car Series, Reckless Ahandon Cc-ETS (3500, on own for dioner, 95% fly in) World Changers Church International, Kansas City Theatre Pipe Organ Concert SC-Street League MT-Max & Ruby Bamy Party Crown Center- Antique Festival Union Station-Perfect Wedding Bridal Show City Street Closures – Grand City Street Closures – Grand City Street Closures – Grand Closed between 13**—14** street,	13 CC- ETS (3500, all meals planned, 95% fby in)	14 CC- ETS (3500, all meals planned, 95% fly in)	15 CC- ETS (3500, all ments planned, 95% fly in)	16 CC- ETS (3500, all meals planned, 95% fty in) 95% fty in) MT-Kenny Loggins MT-Kenny Loggins	17 P&L- Downtown is Happy. Frithy Live Concert Series Crossroads KC – Crossroad Blues Festival	18 CC-June Neal Dance Recital SCR. Keigh P&L-Fannity Fun Days Crown Center- Chalk & Walk Festival
CC-Skills USA (18,700, on own for meals, 50% air, 30% drive, 20% conch) City Market – Jeremy Nichols Band, Art of the Machine Car Series SC-Cleveland Gladiators vs. COMMAND Crown Center- Challe & Walk Festival Norg, there will be munerous and concention against ane closures mound the convention aguare Monday, June 20, reiday, June 24, to accommodate the loading and muloading of students	20 CC-Ställs USA (18.700, on own for meals, 50% air, 30% drive, 20% ctoach) City Street Closures -13 <sup>th</sup> Street (between Wyandotte Street/Brondway Bauleard); elosed Monday, June 20- 23, Central Street (between 12 <sup>th</sup> and 14 <sup>th</sup> streets); elosed Monday, June 20-23.	CC-Skills USA (18.700, on own for meals, 50% air, 30% drive, 20% condul) P&L- Skills USA Event SC-Motley Crue City Street Closures -13 <sup>th</sup> Street Gity Street Closures -13 <sup>th</sup> Street Street/Broadway Bouleward): Gosed Monday, June 20- 23, Central Street (between 12 <sup>th</sup> and 14 <sup>th</sup> streets): closed Monday, June 20-23 City Street Closures - Grand Closed between 13 <sup>th</sup> -15 <sup>th</sup> street, 6:30-10:30pm	CC-Stalls USA (18.700, on own for meels, 50% air, 30% drive, 20% coach) City Street Closures -13 <sup>th</sup> Street (between Wyandotte Street/Broadway Boulevard): 23, Central Street (between 12 <sup>th</sup> and 14 <sup>th</sup> streets); closed Monday, June 20-34, and 14 <sup>th</sup> streets); closed Monday, June 20-23.	CC-Sidils USA (18.700, on own for meels, 50% air, 30% drive, 20% conch, own for Brenkist, Dinner) P&L-Hot Country, Nights City Street Closures -13th Street (between Wyandotte StreetBroadway Bouleward): Street Glosureway, June 20-23, Contral Street (between 12th and 14th street); closed Monday, June 20-23 Briteis); closed Monday, June 20-23 Briteis); closed Monday, June 20-23 Briteis); closed Monday, June 20-23 Briteis	CC-Skills USA (18.700, on own for meals, 50% air, 30% drive, 20% coath.) P&L- Downtown is Happy, Friday Live Concert Series Union Station – Maker Faire, Art of the Chopper Pariens Wear	CC-Wynn Twins School of Dance Union Station – Maker Faire Crown Center-Ice Cream Dreamery MT-Bass Cabaret
26 CC-World Changers Church International Gity Market – Knock Kneed Sally, Art of the Machine Car Series Union Station – Maker Faire Hyatt Reg – Amer, Hereford Assn. (3,000, on own for meals)	27 CC-CTU Graduation Hyatt Reg. – Amer. Hereford Assn. (3,000, on own for meals)	28 Hyatt Reg. – Amer. Hereford Assn. (3,000, on own for meals)	29 Hyatt Reg. – Amer. Hereford Assn. (3,000, on own for meals)	30 P&L-Hot Country Nights Hyatt Reg. – Amer. Hereford Assn. (3,000, on own for meals)		

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	P&L – Downtown is Happy, Friday Live Concert Series Crown Center-Friday Night Flick Hyatt Reg. – Amer. Hereford Assn. (3,000, on own for meals)	8 CC- Barbershop Harmony (9500, 95% on own for meals), 95% on own for meals), S.P.E.B.S.O.S.A. Convention Kansas City Explorers, SC-Barbershop Harmony P.&L. – Downtown is Happy, Friday Live Convent Series Crown Conter-Friday Night Flick, Summer Concert Series	CC-IIIOP (2,500 95% driving on own for meals), fascinate: High School Conference, Bryan Brothers Band P&L. – Downtown is Happy, Friday Live Concert Series MT-Clobal Dance Festival Crawn Center-Friday Night Filek SC-Jatsowille Sharks vs. CO-MMAND Hyart Reg. Plano Technicians Guild (1,000, 80% fly in, 20% drive, on own for meals) Amer. Hereford Assn. (3,000, on own for meals)	22 CC-Silpada Designs (6.000, 70% air, 20% drive, on own for dinner) P&L. Down Counter-Fringe Festival, Friday Night Flick	29 CC-Amer. Acad. Of Family Physicians (3,000, on own for Dimer), Natl. Conference of Family Practice Residents P&L. – Downtown is Happy, Crown Center-Fringe Festival, Friday Night Flick	ower Light. Union Station/ Crown Cen
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		6 CC. Barbershop Harmony (9500, 95% on own for meels) S.P.E.B.S.Q.S.A. Convention. S.C.Barbershop Harmony	13 CC-HOP (2,500 95% driving, on own for meals). Fascinate: High School Confrence MT-red Nugent Hyart Reg. Plano Technicians Guild (1,000, 80% fly in, 20% drive, on own for meals), Amer. Herford Assn. (3,000, on own for meals)	20 CC-Kansas City Explorers	27 CC-Amer. Acad. Of Family Physicians (3.000), Army Fires Symposium & Exposition Crown Center-Fringe Festival	I-Midland Theatre KA – Kemper Aren Frank and all other activities. If you have que voide accurate information in this guidd
		5 CC. Barbershop Harmony (5000. 95% on own for meals) SC-Barbershop Harmony	12 CC-IHOP (2,500 95% driving, on own for meals), Fascinate: High School Conference Hyatt Reg Amer. Hereford Assn. (3,000, on own for meals)	19 AR-Kids Agricultural Learning Fost SC-Cleveland Gladiators vs. COMMAND	26 CC-Army Fires Symposium & Exposition Crown Center-Pringe Festival SC-Sade w/John Legend	iprint Center AR-American Royal M.  resource for convention groups, special ev Association has made every effort to pre
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		AUGUS	AUGUST 2011 EVENTS CALENDAR			
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
City Street Closures: Broadway Closed May-Sept 14th to 17th streets	1 Marriott DT- Internal Revenue Service (1200)	2 SC-American 1dol Live 2011 Marriott DT- Internal Revenue Service (1200)	3 Marriott DT- Internal Revenue Service (1200)	4 P&L-Hot Country Nights Marriott DT- Internal Revenue Service (1200)	S CC-Grantham University Commencement P&L-Downtown is Happy Marriott DT- Internal Revenue Service (1200) Crown Center – Friday Night Concert	6 City Market – Farm to Table Celebration CC-Grantham University Commencement Marriott DT- Internal Revenue Service (1200) Crown Center – Clown Day
7 City Market- Art of the Machine Car Series SC-Sugarland (5000+) Marriott DT- Internal Revenue Service (1200) City Street Closures- Grand Between 13th-14th	8 Marriott DT- Internal Revenue Service (1200)	9 Marriott DT- Internal Revenue Service (1200)	10 Marriott DT- Internal Revenue Service (1200)	CC-August 2011 Athletic CC-August 2011 Athletic Show P&L-Hot Country Nights Marrioft DT- Internal Revenue Service (1200)	12 CC-August 2011 Athletic Show P&L-Downtown is Happy Crown Center – Friday Night Concert	13 CC-August 2011 Athletic Show, Kauffman Scholars Induction Ceremony, KC Roller Warriors
14 City Market -Art of the Machine Car Series, Knock Kneed Sally	15	91	17 SC-Katy Perry(5000+) City Street Closures- Grand Between 13 <sup>th</sup> -14 <sup>th</sup> Ending Mee	18 P&L-Hot Country Nights	19 P&L-Downtown is Happy SC-Keith Urhan(5000+) City Street Closures- Grand Between 13**,14**	20 DT Airport – KC Air Show P&L- Family Fun Days
21 DT Airport – KC Air Show City Market – Art of the Machine Car Series, Jeremy Nichols Band	22	23	24	25 P&L-Hot Country Nights	26 P&L-Downtown is Happy MT-Return to Forever IV	SC-Def Leppard (5000+) Marriott DT- Advanstar Communication, Inc. (6000) City Street Closures- Grand Between 13th-14th
City Market – Art of the Machine Car Series Marriott DT- Advanstar Communication, Inc. (6000)	29 Marriott DT- Advanstar Communication, Inc. (6000)	30 Marriott DT- Advanstar Communication, Inc. (6000)	31 Marriott DT- Advanstar Communication, Inc. (6000)			

CC-Convention Center Events SC-Sprint Center AR-American Royal MT-Midland Theatre KA - Kemper Arena KC REP-Repertory Theatre P&L-Power Light . Union Station/ Crown Center/Destination Crown Center, City Market, City Street Closures - Tention Station Crown Center/Destination Crown Center, City Market,

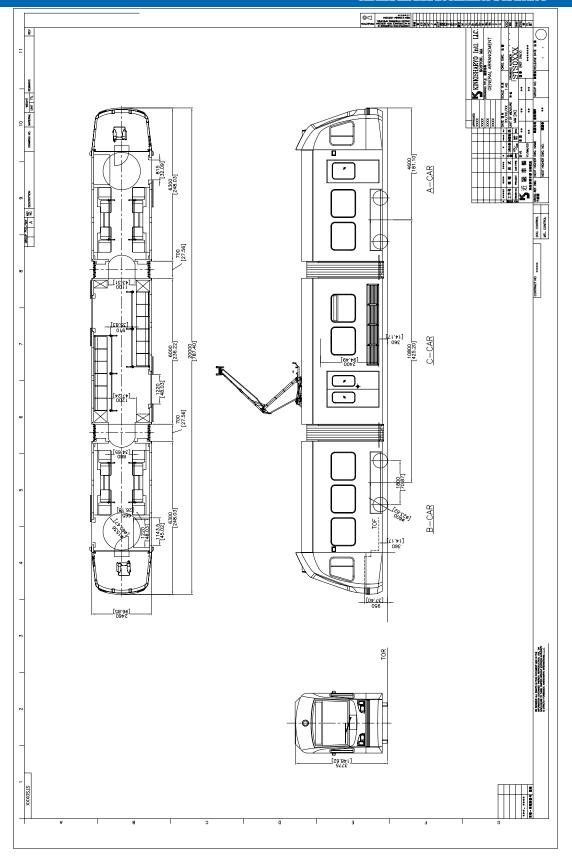
VisiKC.com can be your complete online resource for convention groups, special events and all other activities. If you have questions or would like additional copies contact Betty Buettgenbach at 816-221-5242 or buettgenba

My Sheet

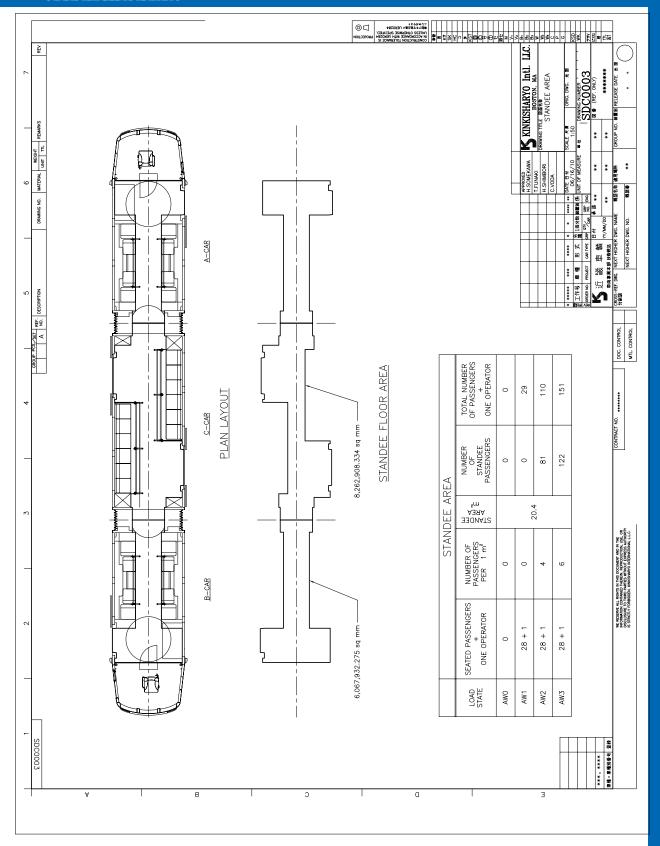


### Attachment B – Vehicle General <u>Arrangements</u>

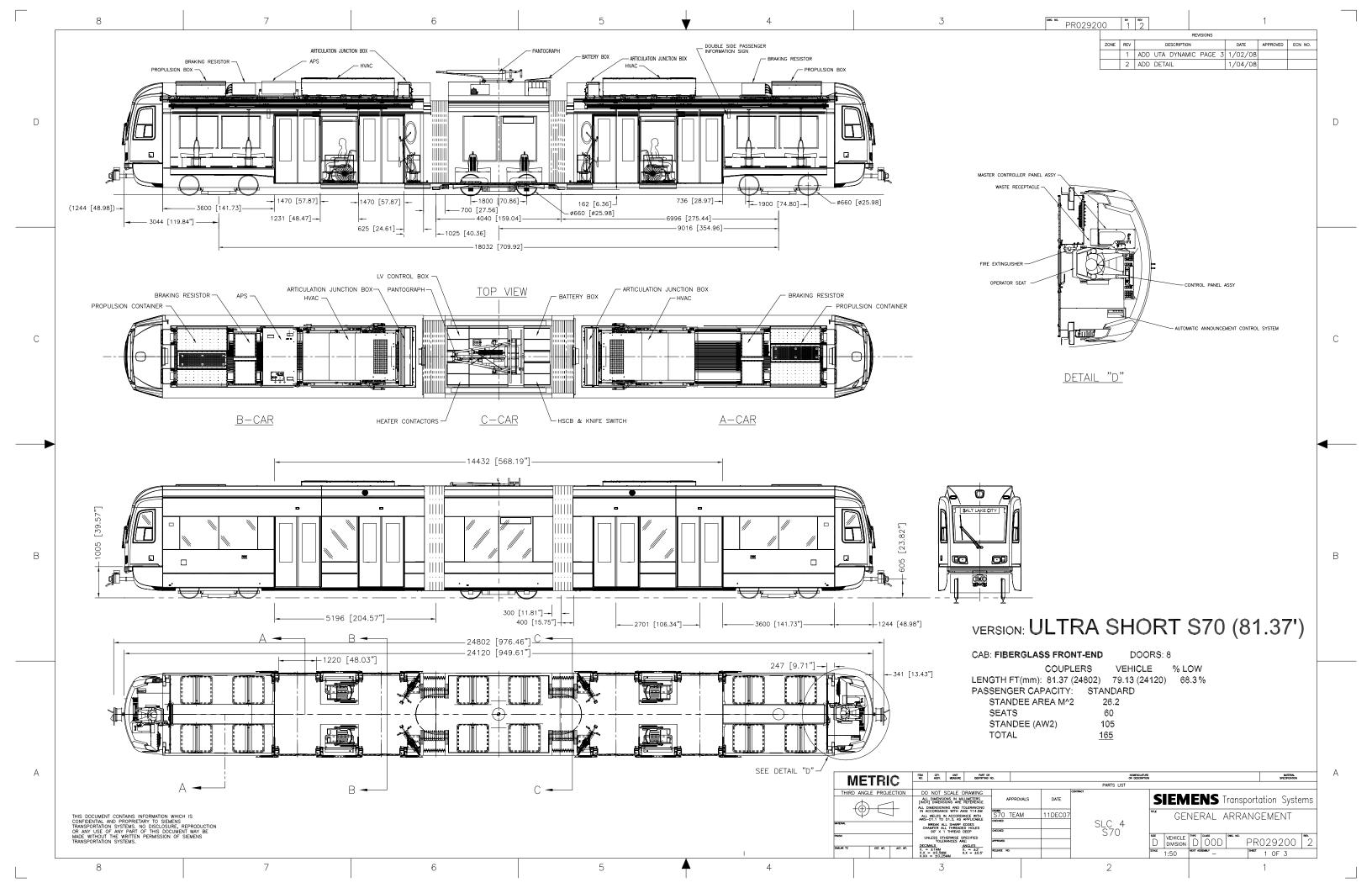


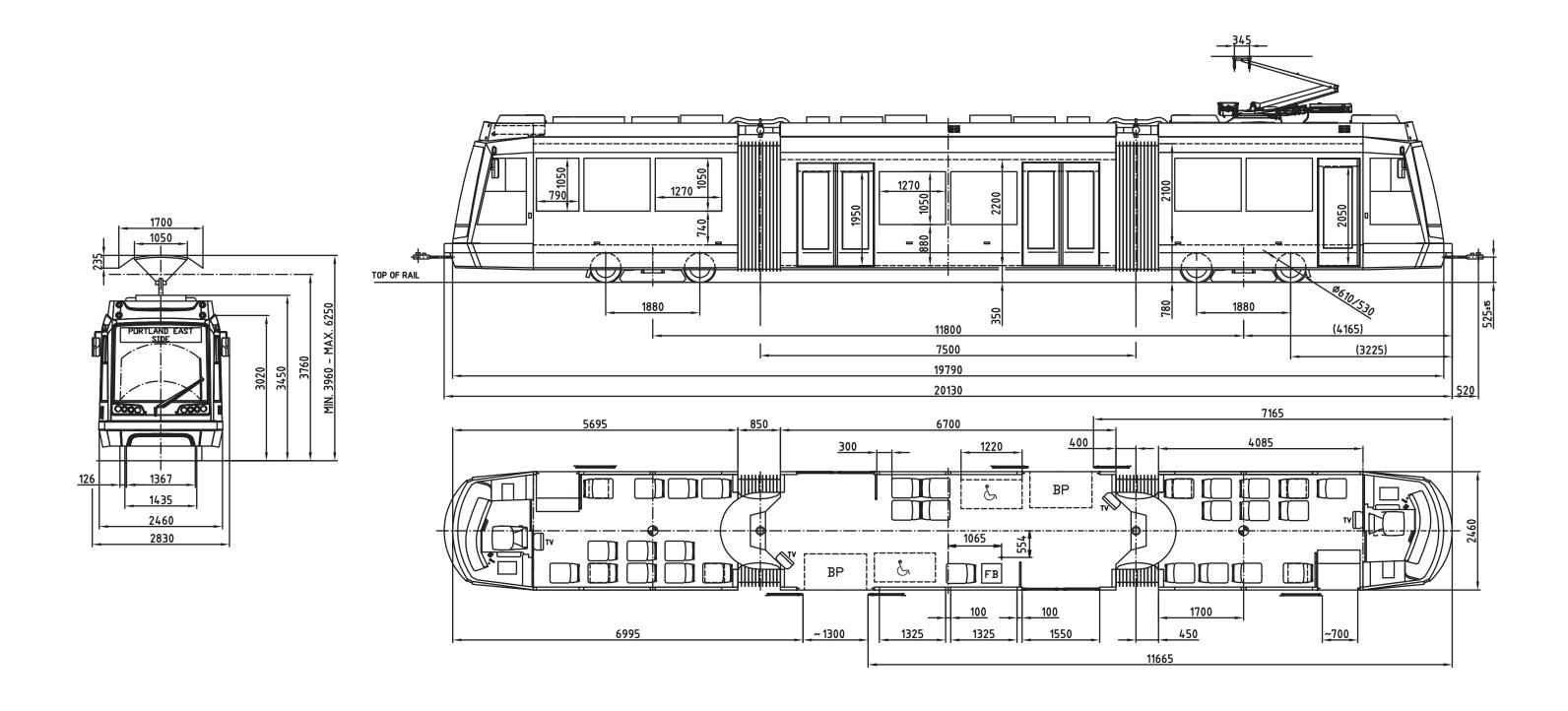














# Attachment C – Initial Screening Of Bridges On Potential Transit Routes







To: Lucas Olson	
From: Cory Imhoff	Project: MARC – Downtown AA
CC: Christopher Kinzel	
Date: 7/13/11	Job No:

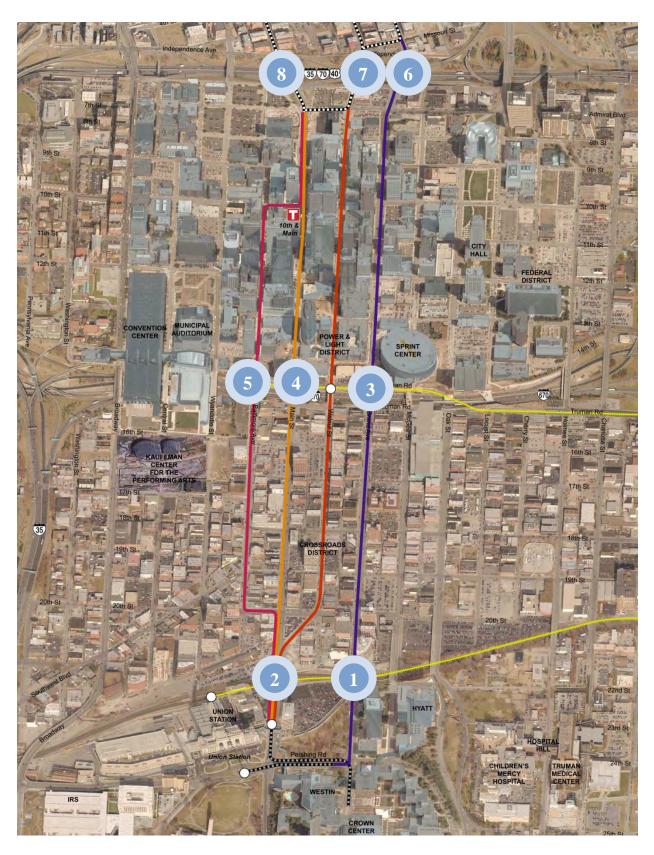
RE: Initial Screening Of Bridges On Potential Transit Routes

The scope of this technical memorandum is an initial screening of bridges from both Kansas City and MoDOT inventories on potential transit routes as part of the Downtown Alternatives Analysis Project.

The transit loading contemplated for the purposes of this screening effort consists of superimposed dead load from 3.5 inches of infill concrete and 112 lb/ft transit rails in addition to the 100 kip (25k-5.9'-25k-29.5'-25k-5.9'-25k) Kinkisharyo Ameritram transit vehicle.

The scope and budget of this initial screening was limited to a maximum effort of 40 hours of Sr. Bridge Engineer time for collection of plans, NBIS database information, plan review, comparative screening calculations and preparation of this memorandum. The scope of this effort does not include exact rating calculations for transit loading, but rather a comparative analysis between transit loading and design loading. This comparative analysis is deemed sufficient to identify areas of strength and weakness along the proposed routes to assist the study team in developing preferred alignment recommendations as part of the Downtown Alternatives Analysis Project. Precise rating calculations for the structures can be completed if necessary with additional schedule and budget.

All structures on potential transit routes were not included in this effort. Figure 1 and Table 1 summarize the structures reviewed in part or detail for this screening effort.



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4435 Main Street Suite 1000 Kansas City, MO 64111 Phone (816) 360-2700 Fax (816) 360-2777 www.hdrinc.com Figure 1 – Location Of Bridges Included In Screening Analysis.

rigui	Figure 1 – Location Of Bridges Included In Screening Analysis.											
Map ID	Bridge No.	Route Carried	Over	Owner	Year Built	Spans	Design Live Load	FWS (psf)	Oper. Rating (Tons)	Inven. Rating (Tons)	Suff. Rating	
1	S052B21	Grand Avenue	KC Terminal Railway	ксмо	1988	50.93'-38.06'-44.98'- 44.98'-45.98'-54.92'- 63.49'(Variable) Composite Steel Beams With Steel Framed Bents	HS20 + Light Rail	50	48	36	75.5	
2	S052B22	Main Street	KC Terminal Railway	КСМО	1980	Main-Walnut Conn 51.25'-50' Voided Slab Spans Unit 1N (SBR) - 44'-50'-35'-36' Voided Slab Spans Unit 1N (NBR) - 49.48'-57.65' Voided Slab Spans Unit 1 - 70'-70' Prestressed I-Girders		25	52	31	77.1	
3	A0820	Grand Avenue	1670	MoDOT	1963	68.22'-68.22' Voided Slab Spans	H20	15	73	35	96.8	
4	A0818	Main Street	1670	MoDOT	1963	68.22'-68.22' Voided Slab Spans	H20	15	66	30	80	
5	A0817	Baltimore Avenue	1670	MoDOT	1963	68.22'-68.22' Voided Slab Spans	H20	15	74	33	78.9	
6	A4224	Grand Avenue	135/170	MoDOT	1990	39.09'-85.21'-79.20'- 46.11' Composite Steel Plate Girder Spans	HS20 Mod.	35	78	46	95.7	
7	L0494	Walnut Street	135/170	MoDOT	1987	49.5'-66.5'-66.5'-49.5' Prestressed I-Girder Spans	HS20 Mod.	35	69	41	78.5	
8	A4223	Delaware Street	135/170	MoDOT	1985	47.86'-64'-71'-71'-65.5'- 53.36' Prestressed I- Girder Spans	HS20 Mod.	35	75	46	90.4	

**Table 1 – Summary Information For Bridges Included In Screening Analysis.** 

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The structures break down into three groups. The first group is the KCMO bridges over KC Terminal Railway just north of Crown Center and Union Station (Map ID's 1 and 2). The second group is the MoDOT voided slab bridges over Interstate 670 that were built in the early 1960's (Map ID's 3, 4 and 5). The third group is the MoDOT steel and precast I-girder bridges over Interstate 35/70 that were built in the late 1980's and early 1990's (Map ID's 6, 7 and 8).

The first group is the structures (Map ID 1 and 2) owned by the city of Kansas City, Missouri that carry Main Street and Grand Avenue over the KC Terminal Railway just north of Crown Center and Union Station. The Grand Avenue bridge (Map ID 1) was built in 1988 with HS20 loading, light rail loads and 50psf future wearing surface (FWS) allowance. It is anticipated that this bridge will perform favorably when subjected to transit loading due to the initial design loading considerations for both transit load and additional wearing surface allowance. An interior line girder analysis using AASHTO Load Factor Design (LFD) distribution factors (S/5.5) and load factors was performed and the maximum and minimum moment envelopes plotted for comparison in Figure 2.

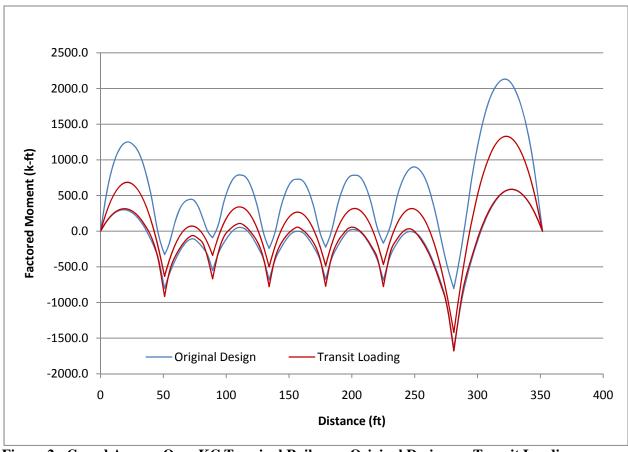


Figure 2 - Grand Avenue Over KC Terminal Railway - Original Design vs. Transit Loading

The plotted moment envelopes indicate that the transit loading produces substantially lower positive moments than the original design loading and close correlation between the two loadings for negative moment. This comparison indicates that the composite rolled beams on the Grand Avenue Bridge over KC Terminal Railway should perform satisfactorily when subjected to transit loading. Cursory capacity checks have been completed for verification of this observation as well. Deck elements and deck support

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4435 Main Street Suite 1000 Kansas City, MO 64111 Phone (816) 360-2700 Fax (816) 360-2777 www.hdrinc.com elements were designed to support 32 kip axles. Without performing detailed calculations, it is anticipated that the 25 kip axles spaced at 5.9' on the transit vehicle will produce lower force demand on the deck and deck support elements than the 32 kip axle and 16 kip wheel load used in the original design of this bridge. A note of caution is necessary on this structure with regard to the steel framed bents supporting the composite steel rolled beams. The negative moment diagrams plotted in Figure 2 indicate higher pier reactions are probable with transit loading than contemplated in the original design. This will result in larger design moments and shears in the steel framed caps. Additional analysis of the steel framed caps is warranted but outside of the scope of this initial screening effort.

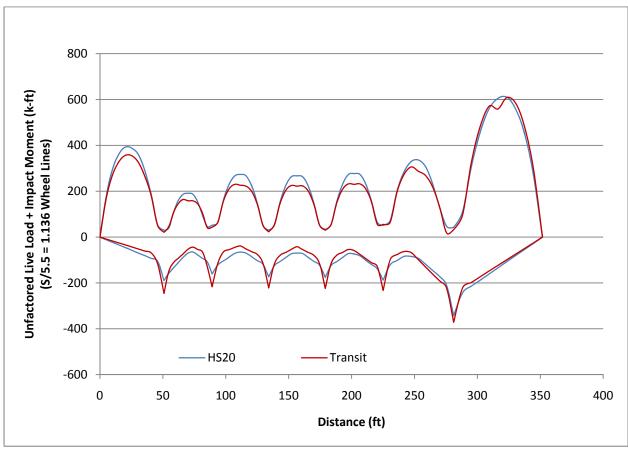


Figure 3 - Grand Avenue Over KC Terminal Railway - HS20 vs. Transit Live Load

Figure 3 shows the difference in live load plus impact for HS20 and transit loading on the Grand Avenue Bridge over KC Terminal Railway. There is very close correlation throughout both the positive and negative moment envelopes. There is a 2.5% to 21% increase in moment depending on span length and arrangement. As the spans increase in length, the difference in negative moment dissipates and the positive moment envelopes converge. In general, transit loading and HS20 loading produce very similar flexural demands on this structure.

The Main Street bridge (Map ID 2) was built in 1980 with HS20 loading and 25psf future wearing surface (FWS) allowance. Detailed load and capacity calculations for this structure were not performed. Based strictly on cursory observation and comparison to the analysis completed on the Grand Avenue Bridge, transit loading could introduce marginally larger negative moments and shear on the voided slab and

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4435 Main Street Suite 1000 Kansas City, MO 64111 Phone (816) 360-2700 Fax (816) 360-2777 www.hdrinc.com precast I-girder units contained within this structure. The current inventory rating of 31 Tons for this structure indicates deficiencies carrying the original HS20 loading. Additional dead load and the transit vehicle weight and geometry could further exasperate the issues reflected by the lower inventory rating. Additionally, this structure contains a large number of expansion joints that will cause more rail mounting and long term maintenance issues as compared to the Grand Avenue bridge.

Within this first group of structures over the KC Terminal Railway tracks, the preferred alignment for transit vehicles would be along Grand Avenue as it is a newer bridge with transit loading considerations incorporated in its design. Based on engineering judgment and limited analysis, either structure could carry transit loading without requiring posting for less than legal loads although the industrial zone rating, operating rating and inventory rating will be further reduced for either bridge. The rating reductions could be minimized by milling approximately 2.5 inches off the existing deck and putting back the 3.5 inches of integral overlay with the transit rails. This would result in a net profile raise of only 1 inch, reduce the dead load demand and minimize rating reductions.

The second group of structures includes the three MoDOT owned voided slab bridges carrying Grand Avenue, Main Street and Baltimore Avenue over I670 (Map ID 3, 4 & 5). Each of these bridges is a two span voided slab bridge with spans of approximately 68.22'-68.22'. These bridges were all built in the early 1960's with H20 loading and 15psf future wearing surface. These bridges have all been modified to support aesthetic fencing, railing and glass panels. The inventory ratings indicate deficiencies carrying HS20 loading with additional dead load and transit live load further exasperating these issues. These bridges are the weak link along any of the transit routes being considered.

Bridge A0818 carrying Main Street over I670 has the lowest inventory and operating rating of all bridges in this group. For this reason, Bridge A0818 has been selected for detailed analysis out of this group. This bridge was analyzed for current dead loads and HS20 loading and for additional transit dead loads and the Kinkisharyo Ameritram transit vehicle loading. As Figure 4 indicates, factored negative moments will increase by approximately 7% at the interior support from current loading conditions with the addition of 3.5 inches of infill paving with transit live load plus impact. Capacity calculations were performed at the maximum positive moment location and for the section adjacent to the drop panels for maximum negative moment. The maximum positive moment section was found to be adequate for both current loading conditions and proposed transit loading assuming no rebar degradation or deck wear/abrasion. Difficulties are not anticipated in the positive moment region for this group of bridges. The negative moment section was found to be overstressed by approximately 4.6% at the single negative moment location that was checked for transit loading. This same location showed adequate capacity for current dead loads and HS20 loading even though the Inventory Rating is 30tons. This indicates a capacity issue at another location within the structure is probable. Detailed rating calculations would help locate this deficiency but is outside the scope of this initial screening effort.

The structure can support transit loading although the factored negative moment exceeds the flexural capacity of the bridge at the interior support. In an effort to minimize this overstress and rating reductions on the existing structures over I670, approximately 2.5 inches of the existing deck should be milled and 3.5 inches of integral overlay placed with the transit rails. This approach will result in a net profile raise of 1 inch and will keep the demands from transit loading in line with that from current loads plus HS20. Based on limited engineering investigation, the voided slab spans over I670 appear to be capable of carrying transit loading.

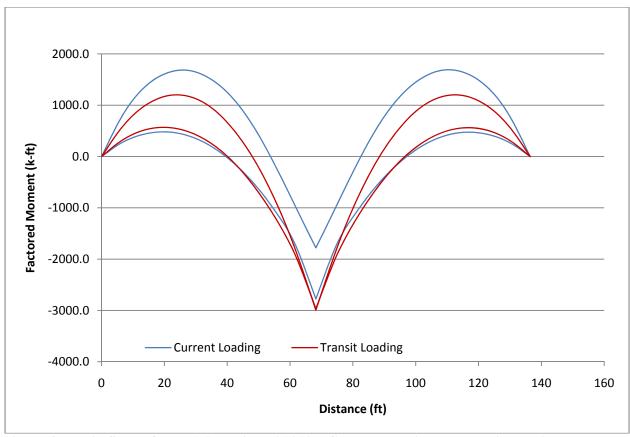


Figure 4 - Main Street Over 1670 - Bridge A0818 - Current Loading vs. Transit Loading

The third group of structures is the three bridges over I35/70 (Map ID's 6, 7 and 8). These bridges were all designed and built in the later 1980's and early 1990's utilizing HS20 Modified loading and 35psf future wearing surface allowances. Based on the limited analytical work completed on the other bridges included in this screening, the structures in this third group are not anticipated to have any major issues carrying transit loading. This is evident in the high operating and inventory ratings for each of these bridges.

#### **Conclusions:**

- 1) The transit live load considered as part of this initial screening analysis produces flexural moments similar to that of HS20 loading.
- 2) The Grand Avenue Over KC Terminal Railway Bridge is preferred to the Main Street Over KC Terminal Railway Bridge for carrying transit traffic due to its original design criteria.
- 3) The voided slab spans over I670 are the weak link in any transit route currently being studied
- 4) Milling existing overlays and excess clear cover prior to placing a 3.5 inch integral wearing surface and transit rails should be considered to both reduce profile grade raise requirements and to minimize reductions in ratings.
- 5) None of the studied bridges should be posted for less than legal loads after transit modifications are completed.
- 6) The bridges over I35/70 will not have a problem handling transit loads since they were designed with HS20 Modified live load and 35psf future wearing surface allowance.
- 7) The optimal route for transit is along Grand Avenue based strictly on bridge performance.



HDR

## **Appendix B**



Maintenance Facility Siting Technical Memorandum





# Maintenance Facility Siting Technical Memorandum

Prepared by:

HDR
HDR Engineering, Inc.

Prepared for:



Date:

7/22/2011



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#### 1 INTRODUCTION

In 2004 and 2009, the Kansas City Area Transportation Authority (KCATA) and the City of Kansas City, Mo.(KCMO), examined the feasibility of a downtown streetcar that could connect the River Market, Central Business District and Crown Center area. An alternatives analysis of fixed-guideway transit between these areas was also conducted in 2008.

The Mid-America Regional Council (MARC), in conjunction with KCATA, local cities, the Unified Government Transit (UGT) and Johnson County Transit (JCT) completed an update to the Smart Moves plan in June 2008 to incorporate new local and regional transit activity, and respond to the community's desire for improvements to the public transportation system. The *Smart Moves Regional Transit Vision*, set forth several recommendations for improving the network of transit services within the metropolitan area and providing the opportunity to realize a range of potential mobility, livability, development, environmental and health benefits. MARC, KCATA, KCMO, and Jackson County, Mo. are again partnering to evaluate one of these proposals in more detail, initiating the Downtown Corridor Alternatives Analysis (AA) to study the feasibility, cost and benefits of constructing an "urban circulator" (i.e. streetcar or enhanced bus service) to connect key locations within a two-mile corridor between River Market, the Central Business District, the Crossroads Arts District, Crown Center and Union Station.

The Downtown Corridor Alternatives Analysis will include a more detailed planning and environmental screening for a potential urban circulator project to connect some of the region's most significant employment and cultural destinations in Kansas City. The two-mile corridor study area is the region's most densely populated corridors, and includes River Market, downtown Kansas City, the Crossroads Art District, Crown Center and Union Station. Union Station is currently served by Amtrak and several KCATA bus routes, and is a potential terminus for future commuter rail. The Downtown Corridor Alternatives Analysis is positioned to advance a Locally Preferred Alternative. This analysis will produce the documentation that would be required if KCATA and KCMO decide to pursue future federal funding to support the design and construction costs of an urban circulator project. These federal requirements include an *Alternatives Analysis* (AA) and comply with federal National Environmental Protection Act (NEPA) requirements.

For the streetcar "build" option, a Vehicle Maintenance Facility (VMF) is needed to provide vehicle storage and maintenance services, including vehicle inspection, exterior washing, interior cleaning, repair activities, and spare parts storage. Space for operations and administrative functions would also be included. The facility must accommodate a minimum of five streetcar vehicles (four active vehicles and one spare), based on a preliminary assessment of vehicle requirements for the build alternative. These conceptual requirements will be confirmed in conjunction with the development of a preliminary operations plan, and resulting VMF needs will be updated as appropriate in future stages of project development.

This technical memorandum defines the general requirements of a VMF site, and identifies a total of sixteen possible sites in the study area that could be considered for a future VMF. Of the sixteen potential sites, only seven exhibited high potential as a future VMF location. The purpose of this memo is to only identify that there are potential sites for a VMF to support the alternatives analysis and build alternatives. A more exhaustive analysis and study would be required to evaluate and recommend a site once the preferred alignment is selected.

For bus-based alternatives, it is assumed that existing KCATA facilities could accommodate additional buses serving the Downtown Corridor Alternatives Analysis area, and no new VMF would be needed. Therefore, the evaluation criteria and potential sites described in this memorandum are specific to the streetcar "build" alternative.

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July 22, 2011

Maintenance Facility Siting Report



#### 2 STREETCAR MAINTENANCE FACILITY EXAMPLES

Operating streetcar systems have used several models for the placement and construction of an operations and maintenance facility. The descriptions below are not all-inclusive, but provide an indication of the range of approaches for the siting and design of a streetcar facility:

**Portland, Oregon** located its facility underneath a freeway overpass. This approach makes full use of land that would otherwise be unlikely to develop (previously used as a parking lot) and minimizes the visibility of the facility. This is purely a functional facility, with little architectural detail or relationship to the surrounding neighborhood.





Figure 1: Streetcar Maintenance Facility in Portland, Oregon

**Seattle** constructed the facility for its South Lake Union Streetcar on a constrained site (less than one acre in size) that is adjacent to existing and new neighborhood uses including a mid-rise residential building and restaurant. The site design located the VMF on the rear portion of a larger lot, accessing the VMF from a side street. The remaining portion of the parcel is a developable site area along the principal street frontage, now in temporary use as a parking lot. This facility program is an example of a small-scale maintenance facility that was incorporated into a neighborhood fabric and integrated with overall redevelopment plans.





Figure 2: Streetcar Maintenance Facility in Seattle (South Lake Union)

The City of Seattle is now examining options for an additional maintenance facility to serve its planned First Hill streetcar line. Among the options being considered is a similar joint development project including a maintenance facility surrounded by mid-rise housing and ground floor retail, with an interior parking garage.

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Figure 3: Concepts for Joint Use Development with Maintenance Facility in Seattle

In the massing diagram above, the maintenance facility is shown in blue, housing is shown in red and orange, retail is shown in yellow, and parking is shown in gray. Source: Central District News, www.centraldistrictnews.com

Tampa constructed a significantly-sized structure in the heart of the Ybor City Historic District. This facility was designed to complement the architecture of the surrounding historic buildings, and includes open green space adjacent to the building. The capability for future expansion to include a streetcar museum was also included in the building design. The intent of the Tampa structure was not to hide the facility, but rather to include a high level of architectural detail and ultimately make the building an attraction in itself.





Figure 4: Streetcar Maintenance Facility in Tampa





#### 3 SITE SELECTION CRITERIA

Several specific criteria were used for evaluating candidate sites for the VMF to serve the Downtown Corridor Alternatives Analysis area. These criteria are described below.

#### • Property size

A streetcar VMF is much more compact than a facility for a larger rail technology such as light rail or heavy rail. The VMF should include sufficient space for a maintenance building, shop area, parts storage, offices, and tracks for storing vehicles but even so, can be accommodated on a relatively small parcel of land. A typical maintenance building for a starter system includes a minimum of two service bays, one with an underground pit for servicing the underside of streetcar vehicles. An elevated platform, or work mezzanine, allows access to the roof-mounted equipment. An overhead crane allows the streetcar vehicle to be lifted to service the trucks and is used for transporting heavy materials. Component repairs are performed in a shop area with adjacent parts, tool storage, and loading dock. Offices, work areas, file rooms, break rooms, and lockers should all be considered when developing the maintenance building program.

Outside of the maintenance building, a typical site for a starter system includes storage tracks, delivery truck access to a loading dock, and areas for parking, and building entrance and exit. A traction power substation to power the yard and lead track, and perhaps a portion of the adjacent alignment, are convenient to locate on-site. The facility is typically secured by walls and/or fences and is lighted for overnight servicing and storage.

Initially, the facility needs to include storage for five streetcar vehicles (based on a preliminary operations assessment), and the ability to expand is preferred. A general guideline for sizing requirements is 0.25 acres per stored vehicle, based on typical sizes of other functioning streetcar facilities and local environmental and topographic conditions. Thus, a site with a minimum size of 1.25 acres is needed to support streetcar operations for the potential project. The option to acquire additional acreage would be beneficial to accommodate more vehicles as the system and fleet size grows.

#### • Site configuration

A site that is regular in shape (i.e. rectangular; width of at least 1/3 the length) offers the most flexibility in design to ensure safe and efficient operations. The size and shape should also enable operational flexibility for the movement of transit vehicles through the site.

#### • Land use compatibility

Traditionally, transit maintenance facilities have been seen as incompatible with residential and commercial uses, and have been treated as strictly industrial uses. However, as illustrated earlier, some streetcar maintenance facilities have moved away from this trend and are examining opportunities to fit within a more cohesive neighborhood context. Streetcar facilities are quite small compared to a large bus garage. Additionally, due to the small scale of streetcar facilities and the type of maintenance and repair work performed in them, noise and traffic typically are not major issues. Furthermore, because starter streetcar lines are generally short in length, the service area may have only a limited amount of land oriented to industrial uses. Seattle's compact facility is immediately adjacent to a mid-rise apartment building, and Tampa's is in a historic mixed-use neighborhood. Portland's VMF is underneath a freeway interchange on land that is unsuitable for other types of development. Compatibility with the desired land use should be considered during future phases of project development and selection of a site for the KCMO Streeetcar.





#### Zoning

Certain sites may be subject to local restrictions that impact the ability to locate a VMF on the site. Each potential site being considered should be evaluated during future phases of project development and during the site selection process. Zoning laws and ordinances may restrict or prohibit a VMF from being built. Typically, areas zoned as residential would not allow a VMF to be built. Locations within the H/O Historic District overlay zoning areas should be avoided. These ordinances restrict development that is not comparable to the existing historic building framework. Sites that are not subject to special restrictions are preferred.

#### • Property ownership and potential acquisition costs

The site should avoid difficult and costly property acquisition. Public ownership of parcels is best for potential VMF sites. If the acquisition of privately-held land is required, the number of parcels should be minimized (it is more difficult to aggregate numerous small parcels as opposed to one or two larger parcels). Parcels that are currently under active use will have higher acquisition costs. Likewise, the number of required business and residential displacements should be minimized.

#### • Constructability

Features such as suitable soil, ease of access for construction equipment, and ample space for materials storage help to contain construction costs for VMF site development. Sites that demonstrate these types of characteristics are favored.

#### Topography and drainage

The selection of a site that is relatively level, with the elevation of the site close to that of the alignment, will minimize costs associated with grading and retaining walls. Standing or running natural water features should be avoided, and the site should be outside of the 100-year floodway. All sites need to be sufficient in size to accommodate appropriate storm water management techniques.

#### Property easements and restrictions on use

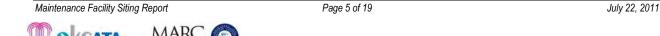
Certain sites may be subject to local restrictions that impact the ability to locate a VMF on the site. As stated earlier, locations within the H/O Historic Overlay zoning areas should be avoided. These ordinances restrict development that is not comparable to the existing historic building framework. Sites that are not subject to special restrictions are preferred.

#### • Joint use potential

While the VMF could be a stand-alone site, partnerships with parties willing to develop the facility as part of a larger development should be considered. The VMF could be built as part of a parking garage structure, or as part of a larger mixed-use development (possibly wrapped by other uses). The joint use site would need to have sufficient space for all desired uses (including expansion opportunities), and the associated impacts (e.g. streetcars entering and leaving the street right-of-way) of any joint uses must be considered. Also, good site access to the developable remainder is critical for effective joint use of sites.

#### • System connectivity (distance to Baltimore, Main, Walnut, Grand route alternatives)

The VMF should be in close proximity (2-3 blocks) to the Downtown Corridor to minimize the construction of non-revenue track to reach the facility. Sites adjacent (less than a block) to the route are preferred, and receive greater consideration than sites that are not contiguous to the selected alignment.





#### 4 MAINTENANCE FACILITY SITE OPTIONS

Sixteen potential VMF sites have been identified for analysis. During the project kick off meeting, KCMO staff provided maps of potential sites that were publicly owned or possible candidates for a VMF. In addition to these sites, HDR has included a handful of other potential sites for consideration. There are six sites in the River Market area, two in downtown Kansas City, six in the Crossroads District and two in the Crown Center/Union Station area near the southern terminus of the alignment. Many of these sites are adjacent to each other and have similar characteristics. The sixteen sites are grouped into one of the four districts:

1-6: River Market sites7-8: Downtown sites9-14: Crossroads sites

15-16: Union Station/Crown Center sites

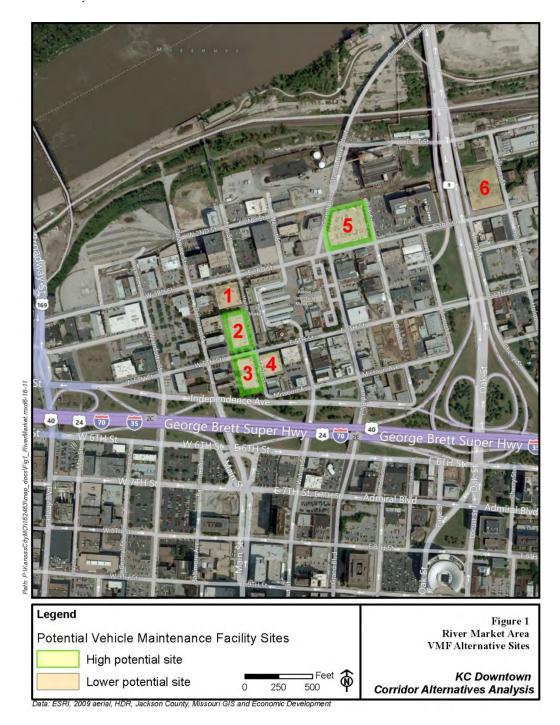
These sites are shown in Figures 1 though 4.





#### 4.1 River Market Sites

Each of these sites is located south of the Missouri River and north of I-70/I-35 (See **Figure 1**). Sites 1-5 are all located west of the Heart of America Bridge (MO-9), while Site 6 is located east of the Heart of America Bridge. Sites 1-5 are zoned as UR-Urban Renewal, which offers substantial flexibility in terms of land use, while site 6 is zoned as M1-5 (manufacturing). Sites 1-4 are owned by KCMO, and site 5 is owned by KCATA. The only private site is site 6, which is owned by Soda Hill LLC. All of the sites are located outside of the 100-year flood zone.



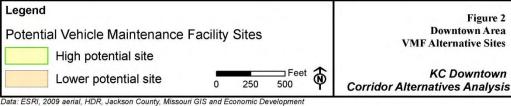
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#### 4.2 Downtown Kansas City Sites

These sites are all located in the Kansas City, Missouri Central Business District (See **Figure 2**). These sites are all bounded by I-35/I-70 to the north, and I-670 to the south. Sites 7-8 are zoned as UR-Urban Renewal, and DC-15 (Downtown Core). Both of these designations offer substantial flexibility in terms of land use. Sites 7 and 8 are owned by KCMO and/or a partnership with a Kansas City Live LLC. These sites have buildings featuring retail and restaurant uses on the northern half of each parcel, while the southern half of each parcel is currently used as surface parking. All of the sites are located outside of the 100-year flood zone.





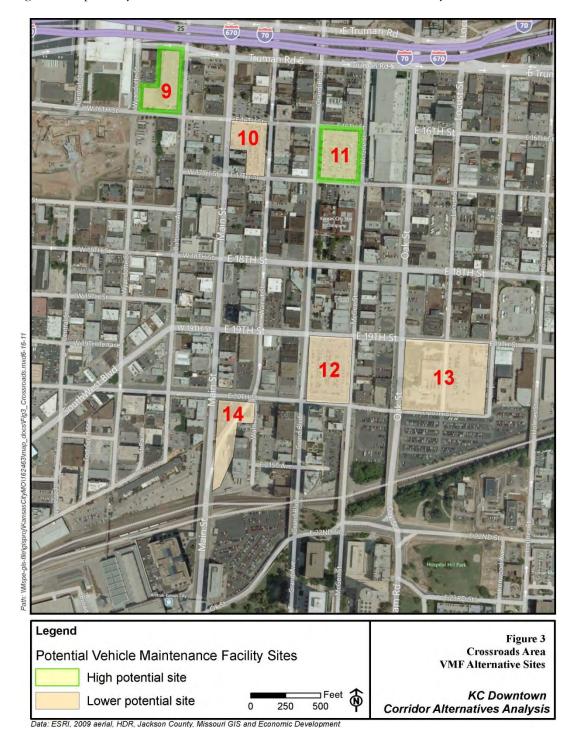
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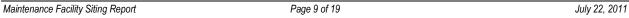




#### 4.3 Crossroads District Sites

These sites are all located in the Crossroads Arts District (See **Figure 3**). These sites are all bounded by I-670 to the north, and the Kansas City Terminal Railway tracks to the south. Sites 9 and 11 are zoned as UR-Urban Renewal, which offer substantial flexibility in terms of land use. Sites 10 and 12 are zoned as B4-5, Heavy Business/Commercial. Sites 13 and 14 are zoned as M1-5 (Manufacturing). All of these sites are vacant or are used for surface parking. Site 9 and approximately half of site 14 is owned by KCMO, while the remaining sites are privately owned. All of the sites are located outside of the 100-year flood zone.

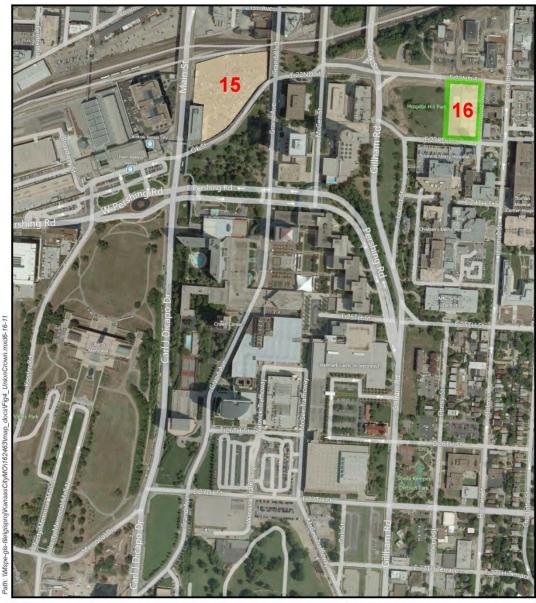


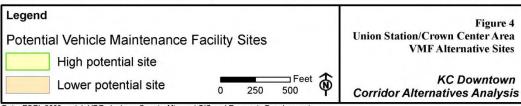




#### 4.4 Union Station/Crown Center Sites

These sites are all located in the Union Station/Crown Center Area (See **Figure 4**). These sites are all bounded by the Kansas City Terminal Railway tracks to the north and E 27th Terrace to the south. Sites 15 is zoned as UR-Urban Renewal, which offer substantial flexibility in terms of land use. Site 16 is zoned as R0.5 (Residential). Sites 15-16 are vacant or are used for surface parking. Site 15 is owned by the Union Station Assistance Corporation. Site 16 is owned by KCMO. All of the sites are located outside of the 100-year flood zone.





Data: ESRI, 2009 aerial, HDR, Jackson County, Missouri GIS and Economic Development



#### 5 ANALYSIS OF SITE OPTIONS

This section describes the evaluation of each VMF option using the criteria presented earlier.

#### 5.1 River Market Sites

These sites are located south of the Missouri River and north of I-35/I-70.

#### Property size

Sites 1-4 are not large enough by themselves to accommodate a VMF. These sites could be combined with each other to create larger sites. Since many of these sites are separated from each other by a roadway, combining some of these sites may have impacts to how these roads are used.

Sites 5 and 6 meet the minimum size requirements for a streetcar VMF site. These properties are some of the larger candidate sites and may have room for future expansion to accommodate a larger fleet.

#### Site configuration

Sites 1-4 are rectangular and narrow, which limits the configurations that can be used, and offer very low operational flexibility for moving transit vehicles through the site.

Sites 5 and 6 are rectangular, each encompassing an entire city block. These sites allow for configurations that offer good operational flexibility for moving transit vehicles through the site.

Sites 5 and 6 are located at near a potential terminus of the streetcar corridor.

#### Land use compatibility

Sites 1-5 are currently zoned in KCMO's UR (Urban Renewal) zoning classification. Based on the definition of this classification, it is likely that this classification would allow for a VMF to be built. Site 6 is currently zoned in KCMO's M1-5 (Manufacturing) zoning classification. Depending on the interpretation of the functional categorization of a VMF, it is possible that a VMF site could be permissible under current zoning with a conditional use.

#### Property ownership and potential acquisition costs

Based on GIS mapping developed by the Jackson County, Missouri GIS and Economic Development department, sites 1-4 are owned by KCMO and would not have significant acquisition costs. Site 5 is owned by KCATA and would likely not have significant acquisition costs. However, site 5 was purchased using federal funds for the Main Street MAX project and would likely require the replacement of any parking stalls displaced by a VMF. Site 6 is privately owned by Soda Hill LLC. Site 6 is currently valued at \$171,900. There may be an opportunity to acquire the use of property through a joint use agreement with the owner. The proposed site consists of three parcels. Displacements of buildings are not anticipated since the property is surface parking lot that is vacant of structures.

#### Constructability

Sites 1-4 are rectangular and narrow, and are adjacent to other buildings. This places limits on construction access and space for materials storage. Demolition of surface parking lots may be required, however the site is vacant of structures.

Sites 5 and 6 appear to have good construction access and some space for materials storage. Demolition of surface parking lots may be required; however, the sites are vacant of structures.





#### Topography and drainage

Most of these sites have a slight downward slope from west to east These sites are located outside of the flood zone.

#### Property easements and restrictions on use

These candidate sites are located outside the H/O Historic Overlay districts. The sites do not appear to be subject to special restrictions.

#### Joint use potential

The VMF could be considered as a stand-alone site in each of these locations. Sites 1-4 all have existing land uses within each of the City blocks they are located on. A VMF on these sites would likely require integration with the existing land uses.

#### System connectivity

Sites 1-5 are all adjacent to or within 700 feet (2 city blocks) of the potential alignment routes (Main, Walnut, Grand). Site 6 is located 1050 feet from Grand, and 1750 feet from Main.

A comparison of the characteristics of the six options for a VMF site is shown in Table 1. Note: The high potential sites are shaded.

Table 1: Summary Comparison of Potential River Market VMF Sites

Parcel	Site Config.	Land Use	Zoning Code	Owner	Property Value	Constructability	Topography	)	Distance from alignment
1 River Market- NW Lot	0.6 acres, square	Empty Lot	UR	КСМО	\$ 507,600	Some access restrictions for construction equipment & storage	Some grade change	High	Main-0' Walnut-350' Grand-700'
2 River Market- W Lot		Parking Lot	UR	КСМО	\$ 288,562	Some access restrictions for construction equipment & storage	Some grade change	High	Main-0' Walnut-350' Grand-700'
3 River Market- SW Lot		Parking Lot	UR	КСМО	\$ 1,041,350	Some access restrictions for construction equipment & storage	Some grade change	High	Main-0' Walnut-350' Grand-700'
4 River Market- S Lot		Parking Lot	UR	КСМО	\$ 525,600	Some access restrictions for construction equipment & storage	Some grade change	High	Main-0' Walnut-170' Grand-520'
5 River Market NE	ICHV DIOCK	Parking Lot	UR	KCATA	\$ 956,400	Good access for equipment and storage	Fairly level	Medium (shape)	Main-700' Walnut-350' Grand-0'
6 3rd/Hol mes	1.3 acres, city block	Empty Lot	M11-5	Soda Hill LLC	\$ 171,900	Good access for equipment and storage	Some grade change	Low	Main-1750' Walnut-1400' Grand-1050'







#### 5.2 Downtown Kansas City Sites

These sites are alls bounded by I-35/I-70 to the north, and I-670 to the south.

#### Property size

Sites 7 and 8 are not large enough by themselves to accommodate a VMF. These sites could be used together with the building occupying one lot and the storage tracks on the other. The two sites would be linked by track(s) and there could be some operational limitations due to the separation of the sites by a roadway.

#### Site configuration

Sites 7 and 8 are rectangular and narrow, which limits the configurations that can be used, and offer very low operational flexibility for moving transit vehicles through the site.

#### Land use compatibility

Sites 7-8 are zoned as UR-Urban Renewal, and DC-15 (Downtown Core). Both of these designations offer substantial flexibility in terms of land use. Based on the definition of these classifications, it is likely that these classifications would allow for a VMF to be built.

#### Property ownership and potential acquisition costs

Based on GIS mapping developed by the Jackson County, Missouri GIS and Economic Development department, sites 7-8 are owned by KCMO and would not have significant acquisition costs. Displacements of buildings are not anticipated since the parcels are surface parking lots that are vacant of structures.

#### Constructability

Sites 7-8 are adjacent to other buildings and have structures occupying portions of each site. This places some limits on construction access and space for materials storage. Some demolition and renovation of structures may be required.

#### Topography and drainage

Most of these sites have a slight downward slope from west to east. These sites are located outside of the flood zone.

#### Property easements and restrictions on use

These candidate sites are located outside the H/O Historic Overlay districts. The sites do not appear to be subject to special restrictions.

#### Joint use potential

The VMF could be considered as a stand-alone site in each of these locations. All of the sites have existing land uses within each of the City blocks they are located on. A VMF on these sites would likely require integration with the existing land uses.

#### System connectivity

Sites 7-8 are all adjacent to or within 700 feet (2 city blocks) of the potential alignment routes (Main, Walnut, Grand).

A comparison of the characteristics of the three options for a VMF site is shown in Table 2. Note: The high potential sites are shaded.



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Table 2: Summary Comparison of Potential Downtown VMF Sites

									Joint	Distance
		Site		Zoning		Property			Use	from
]	Parcel	Config.	Land Use	Code	Owner	Value	Constructability	Topography	Potential	alignment
	7 KC Live 1	1.46 acres, rectangular	Building/ Parking	UR/DC- 15	KCMO	\$3,502,440	Some access restrictions for construction equipment & storage	Some grade change	High	Baltimore- 350' Main-0' Walnut-0' Grand-350'
]	8 KC Live 2	1.46 acres, rectangular	Building/ Parking	UR/DC- 15	КСМО	\$3,545,852	Some access restrictions for construction equipment & storage	Some grade change	High	Baltimore- 700' Main-350' Walnut-0' Grand-0'

#### 5.3 Crossroads District Sites

These sites are all bounded by I-670 to the north, and the Kansas City Terminal Railway tracks to the south.

#### Property size

Site 14 is relatively small, and is below the minimum size requirements. This site offers little opportunity for future expansion.

Sites 9-13 meet the minimum size requirements for a streetcar VMF site. These properties are some of the larger candidate sites and may have room for future expansion to accommodate a larger fleet.

#### Site configuration

Sites 9 and 10 are irregularly shaped and allow for some configuration options and operational flexibility for moving transit vehicles through the sites.

Sites 11-13 are rectangular, each encompassing an entire city block. These sites allow for configurations that offer good operational flexibility for moving transit vehicles through the site.

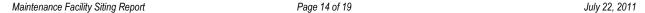
Site 14 is a collection of public and privately owned parcels that is intersected by the Main/Walnut viaduct. The irregular shape would limit configuration options, and would offer limited operation flexibility for moving transit vehicles through the site.

#### Land use compatibility

Sites 9 and 11 are zoned as UR-Urban Renewal, which offer substantial flexibility in terms of land use. Sites 10 and 12 are zoned as B4-5, Heavy Business/Commercial. Sites 13 and 14 are zoned as M1-5 (Manufacturing). Depending on the interpretation of the functional categorization of a VMF, it is possible that a VMF site could be permissible under current zoning with a conditional use.

#### Property ownership and potential acquisition costs

Based on GIS mapping developed by the Jackson County, Missouri GIS and Economic Development department, site 10 is owned by KCMO and is not anticipated to have significant acquisition costs. Sites 10-13 are owned by various private companies. Site 14 has several parcels, the largest of which is owned by Frontline Development Real Estate Fund I LLC, with the rest being owned by KCMO. There may be an opportunity to acquire the use of private property through a joint use agreement with the owner.







#### Constructability

Sites 9-12 appear to have good construction access and ample space for materials storage. Demolition of surface parking lots may be required, however the sites are vacant of structures.

Sites 13 and 14 are adjacent to other buildings and/or have structures occupying portions of the site. This places some limits on construction access and space for materials storage. Some demolition and renovation of structures may be required.

#### Topography and drainage

Most of these sites have a slight downward slope from west to east. These sites are located outside of the flood zone.

#### Property easements and restrictions on use

These candidate sites are located outside the H/O Historic Overlay districts. The sites do not appear to be subject to special restrictions.

#### Joint use potential

The VMF could be considered as a stand-alone site in each of these locations. Some of the sites have existing land uses as surface parking. A VMF on these sites could be integrated with additional land uses (building/parking/storage).

#### System connectivity

Sites 10 and 14 are all adjacent to or within 350 feet (1 city blocks) of the potential alignment routes (Baltimore, Main, Walnut, Grand). Site 9 is located 1050 feet from Grand, and 350 feet from Main. Sites 11 and 12 are adjacent to Grand and 1050' from Baltimore. Site 13 is 1700' from Baltimore, and 700' from Grand.

A comparison of the characteristics of the six options for a VMF site is shown in Table 3. Note: The high potential sites are shaded.

Table 3: Summary Comparison of Potential Crossroads VMF Sites

	Site		Zoning		Property			Joint Use	Distance from
Parcel	Config.	Land Use	Code	Owner	Value	Constructability	Topography	Potential	alignment
9 Convention Center	1.9 acres, irregular	Parking Lot	UR	КСМО	\$1,526,700	Good access for equipment and storage	Steep grade change	Low	Baltimore-0' Main-350' Walnut-700' Grand-1050'
10 Crossroads NW Total	1.42 acres, irregular	Parking Lot	B4-5	Various Private	\$1,124,900	Good access for equipment and storage	Some grade change	Moderate	Baltimore- 350' Main-0' Walnut-0' Grand-350'
11 Crossroads North	2 acres, city block	Parking Lot	UR	Cypress Media LLC	\$1,556,750	Good access for equipment and storage	Some grade change	High	Baltimore- 1050' Main-700' Walnut-350' Grand-0'
12 Crossroads South Total	2.3 acres, city block	Parking Lot	B4-5	Fortis, Inc	\$1,976,200	Good access for equipment and storage	Some grade change	High	Baltimore- 1050' Main-700' Walnut-350' Grand-0'





Parcel	Site Config.	Land Use	Zoning Code	Owner	Property Value	Constructability	Topography	Joint Use Potential	Distance from alignment
13 19th/ Oak/20th	5.71 acres, city block	Building/ Parking	M1-5	Various	\$1,440,000	Good access for equipment and storage	Some grade change	High	Baltimore- 1700' Main-1350' Walnut- 1050' Grand-700'
14 Main/ Walnut Viaduct	0.86 acres, irregular	Empty Lot/ Parking	M1-5	KCMO/ Frontline	\$664,780	Some access restrictions for construction equipment & storage	Steep grade change	Low	Baltimore- 350' Main-0' Walnut-0' Grand-350'

#### 5.4 Union Station/Crown Center Sites

These sites are all bounded the Kansas City Terminal Railway tracks to the north and E 27th Terrace to the South.

Sites 15 is zoned as UR-Urban Renewal, which offer substantial flexibility in terms of land use. Site 16 is zoned as R0.5 (Residential). Sites 15-16 are vacant or are used for surface parking. Site 15 is owned by the Union Station Assistance Corporation. Site 16 is owned by KCMO.

#### Property size

All of the sites (15-16) meet the minimum size requirements for a streetcar VMF site. These properties are some of the larger candidate sites and may have room for future expansion to accommodate a larger fleet.

#### Site configuration

Site 15 is irregularly shaped and allows for some configuration options and operational flexibility for moving transit vehicles through the sites.

Site 16 is rectangular, encompassing an entire city block or more. This site allow for configurations that offer good operational flexibility for moving transit vehicles through the site.

#### Land use compatibility

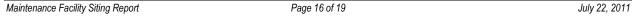
Sites 16 and 18 are zoned as UR-Urban Renewal, which offer substantial flexibility in terms of land use. Site 17 is zoned as R-0.5 (Residential). Some sources show portions of this site as a part of Hospital Hill Park. All of these sites are vacant or are used for surface parking. Depending on the interpretation of the functional categorization of a VMF, it is possible that a VMF site could be permissible under current zoning with a conditional use for the UR zoning. Allowing a VMF on site 17 would likely require rezoning.

#### Property ownership and potential acquisition costs

Based on GIS mapping developed by the Jackson County, Missouri GIS and Economic Development department, site 16 is owned by KCMO and is not anticipated to have significant acquisition costs. Site 15 is owned by Union Station Assistance Corporation.

#### Constructability

All sites (15-16) appear to have good construction access and ample space for materials storage. Demolition of surface parking lots may be required on some sites, however the sites are vacant of structures.







#### Topography and drainage

Most of these sites have a slight downward slope from west to east and south to north. These sites are located outside of the flood zone.

#### Property easements and restrictions on use

These candidate sites are located outside the H/O Historic Overlay districts. The sites do not appear to be subject to special restrictions.

#### Joint use potential

The VMF could be considered as a stand-alone site in each of these locations. Some of the sites have existing land uses within each of the City blocks they are located on. A VMF on these sites could be integrated with additional land uses.

#### System connectivity

Sites 15 is adjacent to the potential alignment routes (Main, Grand). Site 16 is 1550' from Main and 800' from Grand.

A comparison of the characteristics of the six options for a VMF site is shown in Table 4. Note: The high potential sites are shaded.

Table 4: Summary Comparison of Potential Union Station/Crown Center VMF Sites

Parcel	Site Config.	Land Use	Zoning Code	Owner	Property Value	Constructability	Topography	Joint Use Potential	Distance from alignment
15 BCBS Parking	4.8 acres, irregular	Parking Lot	UR	Union Sta. Assistance Corp.	\$2,669,500	Good access for equipment and storage	Some grade change	High	Main-0' Grand-0'
16 Hospital Hill Mid	2.9 acres city block	Empty Lot/ Park?	R-0.5	KCMO	\$1,250,000	Good access for equipment and storage	Some grade change	High	Main-1500' Grand-800'

#### 6 SITE ANALYSIS SUMMARY

## 6.1 Determination of High Potential Sites

#### 6.1.1 Initial Review

The evaluation of the eighteen sites provides a framework for determining the feasibility of each of these sites in general, and offers insight to how these sites compare relative to each other. A review of the evaluation results (Tables 1-4) allows for determination of sites that have "High Potential" as a future VMF location. These "High Potential" sites generally have several characteristics in common with each other, including:

- Size of 1.25 acres or greater
- Surface parking lot or vacant land use (absent of buildings)
- Ownership by KCMO or other public agency
- Good constructability
- Close proximity to Baltimore, Main, Walnut, or Grand route alternatives

In the River Market area, sites 2 and 3, if combined together, and site 5 would have a "High Potential" for a future VMF location. Each of these sites has a suitable shape and size to allow for various configuration options and for future expansion. These sites are all owned by KCMO or KCATA, which would minimize





property acquisition costs. Finally, these sites are in close proximity to all of the alignment alternatives, and are situated near the northern terminus.

In the Downtown Kansas City area, sites 7 and 8, if used together, would have a "High Potential" for a future VMF location. Each of these sites has a suitable shape and size to allow for various configuration options and for future expansion. These sites are owned by KCMO, which would minimize property acquisition costs. These sites are in close proximity to all of the alignment alternatives, and are situated approximately halfway between the potential northern and southern ends of the line.

In the Crossroads District, sites 9 and 11 have a "High Potential" as future VMF locations. Each of these sites has a suitable shape and size to allow for various configuration options and for future expansion. Site 9 is owned by KCMO, while site 11 is owned by a private company. These sites are in close proximity to all of the alignment alternatives, and are situated approximately halfway between the potential northern and southern ends of the line.

In the Union Station/Crown Center area, site 16 has a "High Potential" as a future VMF location. This site has a suitable shape and size to allow for various configuration options and for future expansion. Site 16 is owned by KCMO, which would minimize property acquisition costs. This site is located near the southern terminus and in close proximity to the Grand Blvd. alternative alignment. It would be more challenging to access from Main, Walnut and Baltimore.

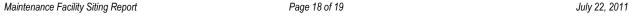
#### 6.1.2 Additional Review and Conclusions

Most of the sites evaluated would be feasible for a VMF location. While all of the sites may benefit from further review, the "High Potential" sites identified in the previous section (6.1.1) may provide a better foundation from which to base future analysis. Subjecting these sites to more stringent and clearly defined criterion (including identification of a preferred alignment) will be helpful in determining which sites have the greatest potential as a VMF location.

Table 5 below is the combination of the high potential sites and includes the average property value of these sites. For the purpose of establishing a project cost, the average property value of the "high" potential sites will be used to develop the opinion of probable costs.

Table 5: Summary of High Potential Sites and Average Cost

Parcel	Site Config.	Land Use	Zonin g Code		Property Value	Constructability	Topograph v	ř	Distance from alignment
2 River Market- W Lot	1 acre, rectangular	Parking Lot		КСМО	\$ 288,562	Some access restrictions for construction equipment & storage	Some grade change		Main-0' Walnut-350' Grand-700'
3 River Market- SW Lot	1	Parking Lot	UR	KCMO	\$ 1.041.350	Some access restrictions for construction equipment & storage	Some grade change	High	Main-0' Walnut-350' Grand-700'
5 River Market NE	lcity block.	Parking Lot	UR	KCATA	\$ 956,400	Good access for equipment and storage	Fairly level	Medium (shape)	Main-700' Walnut-350' Grand-0'
7 KC Live 1	,	O,	UR/D C-15	КСМО	\$3,502,440	equipment & storage	Some grade change		Baltimore-350' Main-0' Walnut-0' Grand-350'
8 KC Live	,	O,	UR/D C-15	KCMO	<b>%</b> 3 545 852	Some access restrictions for	Some grade change	High	Baltimore-700' Main-350'







			Zonin		Property		Topograph	Joint Use	Distance from
Parcel	Site Config.	Land Use	g Code	Owner	Value	Constructability	У	Potential	alignment
2						construction			Walnut-0'
						equipment & storage			Grand-0'
9 Conventi on Center		Parking Lot	UR	КСМО	\$1,526,700	Good access for equipment and storage	Steep grade change	Low	Baltimore-0' Main-350' Walnut-700' Grand-1050'
( rossroa		Parking Lot	UR	Cypress Media LLC	\$1,556,750	Good access for equipment and storage	Some grade change	High	Baltimore- 1050' Main-700' Walnut-350' Grand-0'
Hospital	2.9 acres city block	Empty Lot/ Park?	R-0.5	КСМО		Good access for equipment and storage	Some grade change	High	Main-1500' Grand-800'

<u>Average Cost</u> \$1,708,506





# **Appendix C**



## **Utility Identification Summary**









JULY 2011

# Utility Identification Summary









#### INTRODUCTION

The purpose of this summary is to identify the locations of utilities along the possible alignments for the Downtown Corridor Alternatives Analysis (AA). Identifying the location of these utilities will assist in determining the location of the proposed transit route. Figure 1 shows the study area for the AA. Figure 2 shows the Tier 1 Alignment Alternatives being considered.

The sources for the data include public data from Kansas City, Missouri (KCMO) and private data from the individual utility owners. A CADD base map has been created to visually present utilities that fall within the AA study area. Once a locally preferred alternative (LPA) is selected, field surveys and subsurface utility engineering will be necessary to accurately locate and assess the utility impacts.

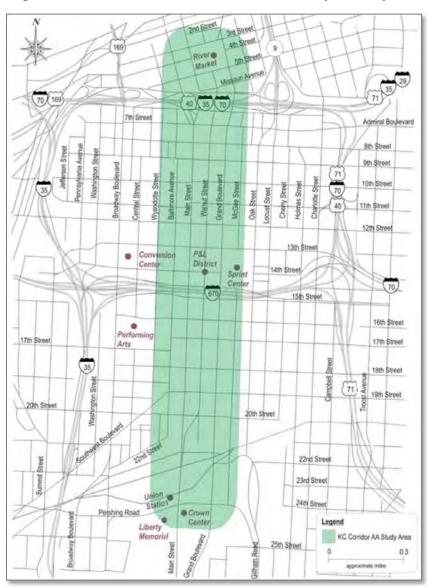


Figure 1. Downtown Corridor Alternatives Analysis Study Area

Alt 5 Grand Avenue/Walnut Street Alt 1 Grand Avenue Alt 2 Main Street Alt 6 Main Street/Walnut Street Alt 7 Main Street/Baltimore Avenue Alt 3 Walnut Street Alternative Alignments between Downtown and River Market Alt 4 Baltimore Avenue Alternative Alignments between Downtown and River Market Potential South End Extensions Potential South End Extensions Potential Commuter Rail Alignments Potential Commuter Rail Alignments O Potential Streetcar/Commuter Rail Transfer Location O Potential Streetcar/Commuter Rail Transfer Location Transit Center Transit Center

Figure 2. Tier 1 Alignment Alternatives

#### **Utility Research**

Hg Consult, Inc. contacted all of the utility companies individually in the study area. A list of those companies and their contact information is shown in Table 1. The utilities in the area include water, sanitary sewer, storm sewer, gas, electric (overhead and underground), steam/chilled water, and communications.

**Utility Company Main Contact** Phone# Email **Utility Type** KCMO GIS (816) 513-6645 Kristin Collins Kristin.Collins@kcmo.org KCMO - Sewer & Water KCMO ROW (816) 985-0683 Tony Cosentino Anthony.Cosentino@kcmo.org KCMO - Sewer & Water (913) 676-1846 AT&T Russ Claybaker rc9574@att.com Communications Verizon/MCI/Brooks Donald Torbett (918) 269-4698 donald.torbett@verizonbusiness.com Communications Veolia Energy Billy Sinkhorn (816) 471-3484 bsinkhorn@veoliaenergyna.com Steam, Chilled Water Margie.Blackburn@SUG.com (816) 472-3446 Missouri Gas & Energy (MGE) Margie Blackburn Gas Kansas City Power & Light Erin Boatright (816) 245-3765 Erin.Boatright@kcpl.com Electric AboveNet Bob Howard (713) 344-2156 RHoward@above.net Communications Time Warner Cable Communications **Dwight Davis** (816) 591-0282 ddavis@zayo.com Zavo Communications

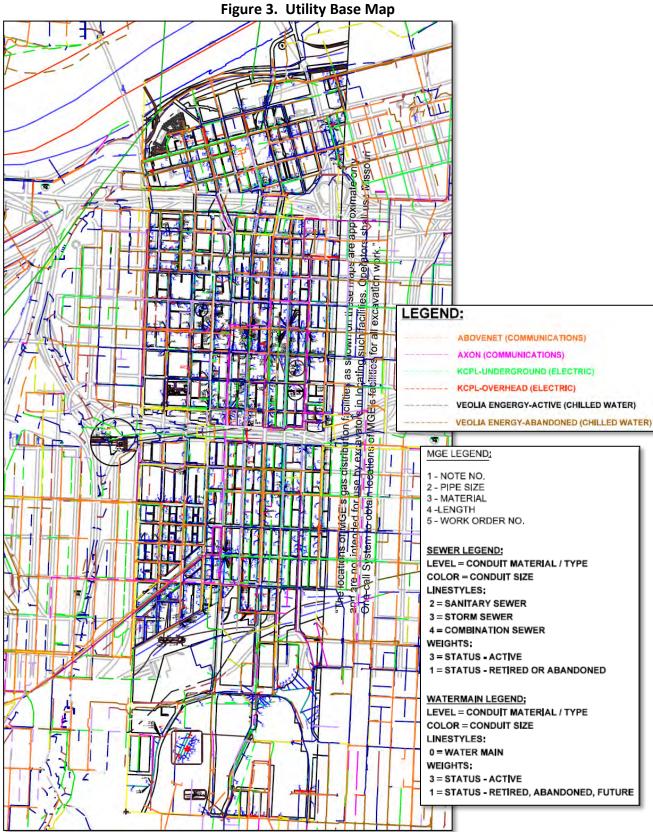
**Table 1. Utility Contacts** 

A utility matrix has been developed for each alternative which lists the utilities that are located within the streets that make up the alignment alternatives. The utility information includes size of line, type of material, scoring, location, length, and owner. A matrix for each alternative is included in the Appendix.

In addition, a utility base map has been created in CADD to provide a consolidated map of all of the utilities in the study area. This map was created using the information provided by each of the utility companies and is shown in Figure 3. Missouri Gas & Electric and Time Warner Cable provided CADD files. The files from KCMO were provided in a GIS format and converted to a CADD file. The rest of the utilities were manually drawn into CADD based on electronic asbuilts. AT&T and Verizon/MCI refused to provide documentation of the location of their utility lines. Instead, they provided a ranking of their preferred routes, as shown in the following table.

Table 2. Route Ranking by AT&T and Verizon/MCI

	Ranking									
	AT&T	Verizon/MCI								
Grand Avenue	1st	2nd								
Walnut Street	3rd	3rd								
Main Street	2nd	4th								
<b>Baltimore Avenue</b>	3rd	1st								



Note: Figure 3 is for illustration purposes only, more detailed 100 scale utility composite drawings will be included with conceptual plans.

Axon

#### **Utility Summary**

Based on the information in the matrices, a summary table was created to assist with ranking the alternatives. Each utility was assigned a score based on the size or location of the utility. Table 3 shows the scoring system by utility type. Some of the utility companies did not include the size of their utilities in the data provided. For steam/chilled water utilities, all the street sections containing this pipe were scored equally. Electric scoring was based on the location of the utility. Under communications, Axon was given a higher score because it is a large duct line containing numerous communication lines for multiple companies. Table 4 shows the total score by alternative for the study area. The total scoring does not include the rankings provided by AT&T or Verizon/MCI.

Scoring Medium Small Large/XL **Utility Type** 1 2 3 Water 0"-10" 10"-16" 16"+ Sanitary Sewer 0"-10" 16"+ 10"-16" Storm Sewer 0"-30" 30"-48" 48"+ Sanitary & Storm Sewer 48"+ 0"-30" 30"-48" 0"-4" 4"-8" 8"+ Steam/Chilled Water ΑII Electric Overhead Underground

**Table 3. Utility Scoring** 

**Table 4. Total Utility Scoring by Alternative** 

TWC/AboveNet

		Water	Sanitary Sewer	Storm Sewer	Sanitary & Storm Sewer	Gas	Steam/ Chilled Water	Electric	Communications	Total
Alt. 1	Grand Avenue	67	69	5	26	91	7	66	29	360
Alt. 2	Main Street	53	57	10	17	64	12	50	128	391
Alt. 3	Walnut Street	78	93	27	26	98	5	48	44	419
Alt. 4	Baltimore Avenue	95	93	8	14	86	15	56	50	417
Alt. 5	Grand Ave. & Walnut St.	145	162	32	52	189	12	114	73	779
Alt. 6	Walnut St. & Main St.	131	150	37	43	162	17	98	172	810
Alt. 7	Main St. & Baltimore Ave.	132	129	17	26	137	26	88	164	719

Note: Total score is based on the summation of all the individual utility scores located within the streets of a particular alignment alternative.

Communications

#### **Conclusions**

The data contained in this summary can be used to identify utility impacts and potential relocation costs associated with each alternative. The impact of utilities and their potential need for modification or relocation is just one of the many factors used in the selection of the LPA.

Based on the utility scoring, Alternatives 5 thru 7 have the highest utility impacts. Having the transit line operate on two streets will have higher impacts and potential increased costs associated with impacted utilities. Alternative 1 that runs along Grand Avenue, will have the least amount of utility impacts. At the other end of the spectrum, Alternative 3 that follows Walnut Street, will have the highest number of utilities requiring potential modification or relocation.

Once the LPA is selected, additional investigations will be needed to determine the exact location of the utilities. Coordination with each impacted utility company will be necessary to make final determinations of any necessary modifications or relocations and to include these in the overall project schedule. Any new utility construction should take into consideration the LPA in order to prevent any additional impacts.

## **A**PPENDIX

## Alternative 1 – Grand Avenue

П	Cross	Streets			Wa					Sanitar	•	r			Storm S	Sewer	7E I -			y & Sto	orm Sew	/er			Gas				lled Water		Electri			(	Commu	nications	<u> </u>
Street	Stora et	t- Cht	Size	Coor	KCI		Len	gth S	Size Co.		МО	Length	Size	Caara	KCM	Loc	Length	Size	Caara	KCM		Length (ft)	Size			& Energ	y Length	Veolia		Caara	KCP&I		Coord			Length	Ourner
$\square$		to street	(in)	3001		e Loc	(ft	t) (	in)	оге Тур	P P	``	(in)	Score	Туре	Loc	(ft)	(in)	Score	туре	LOC	(ft)	` '		PCS		(ft)	Score	Loc		Type			Туре	e Loc	(11)	Owner
	Missouri Ave.	to Independence Ave.	6 12	2	CIP		21	10	36 3	s vc	PP	188	1										2	1	PCS	Р	203	1	P	2	UDG		1		C	56 99	TWC
	Independence Ave.																											1	P	2	UDG	_			$\perp$		
	6th St.	to Admiral Blvd.	6	1	CIP		30	_		_			1															1	С	2	UDG	+	+		+		
1 1	Admiral Blvd.	to 8th St.	20 12	2	CIP		27 34	_	15 2	2 VC	P P	171	1										4	2	PE	Р	320			2	UDG	_	+	+	+-	+	
			6	1	CIP		30	-		2 VC		185											4	2	PE	Р	20										
	8th St.	to 9th St.	12		CIP		34	_	15 2	2 VC	P P	137	6	1	RCP	С		15	1	VCP	Р	34	4	2	PE	Р	279			2	UDG	_	1		С	328	TWC
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1 1	9th St.	to 10th St.	12	2	CIP			_	15 2	2 VC	P P	194	1					15	-	VCF	-	37	2	1	PCS	Р	70	1	С	2	UDG	Р	1		Р	+	AboveNe
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			10	2	CIP	С	30	0					1										2	1	PE	P	336					1	+		+		
1 }	10th St.	to 11th St.	12	2	CIP	P	43	12	15 2	2 VC	P P	431	1										2	1	PCS PCS	P P	52 88			2	UDG	С	3	Axor	n P	+	Multiple
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	11th St.	to 12th St.	12	2	CIP	р	38	29	18 3	3 VC	P P	422	+			-							4	2	PCS	P	200	1	С	2	UDG	С	1		C	730 112	TWC
	1111131.	121131.	6	1	CIP		_	_	15 2				1										4	2	PE	P	19			2	UDG	_	1		P	50	TWC
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	18th St.	to 19th St.	12	2	CIP	С												24	1	VCP	Р	260	8	3	CI	P	400			2	UDG	С	1		С	1245	TWC
			6	1	CIP													24	1	VCP	Р	255	6	2	CI	Р	11										
	19th St.	to 20th St.	4	1	CIP			_		_		_	12	1	VCP	68	С	24	1	VCP	P	228	6 8	3	PE CI	P P	50 400				+	-	1	-	С	108	TWC
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	21st St.	to Pershing Rd.	16	3	CIP	Р	18	31 1	183 3	BRIG	CK P	148		1			158	183			С	78								2	UDG	_	1		C	20	TWC
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## Alternative 2 – Main Street

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į,	Cros	ss Str	reets							$\perp$			ксмс						мо					КСМ			_	Miss	ouri Gas		rgy		Energy		KCP&				ommun	nications	<u>;</u>
	Street	to	Street	Size (in)		е Ту	/pe	Loc	Lengt (ft)	h Siz	e S	core	Туре	Loc	Lengtl (ft)	Size (in)	Scor	е Тур	e L	oc l	Length (ft)	Size (in)	Score	Туре	Loc	Length (ft)	Size (in)	Score	Туре	Loc	Length (ft)	Score	Loc	Score	Туре	Loc	Score	Туре	Loc	Length (ft)	h Owner
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ł	8th St.	to	9th St.	12	2	С	IP.	Р	38	18	3	3	VCP	Р	150																			2	UDG	С	1		P C	373 205	
	041- 54		10th Ct	12			IP.	P C	284	24	-	-	BRICK VCP	P	150 61												,	-	DDC	P	31			2	UDG	P P	1		C	$\perp$	TWC
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ļ				8			IP.	Р	418	_	$\bot$											27	1	VCP	Р	72	4	2	PE	Р	403			2	UDG	С	1		P	394	TWC
ŀ		H			+	+	$\dashv$		+	+	+									$\dashv$		27	1	VCP	P	204	-	-						2	UDG	P C	1		P P	41 192	TWC
ļ		H					$\dashv$				$\downarrow$																							2	UDG	Р	1		Р	70	TWC
			Total		53					+	+	57				+	10		+				17			-	-	64				12		50	UDG	Р	1 128		P	38	TWC

	Types of Pipes
BRICK	Brick Pipe
CI	Cast Iron Pipe
CIP	Cast Iron Pipe
CU	Copper Pipe
DIP	Ductile Iron Pipe
PBS	Protected Bare Steel Pipe
PCCP	Prestressed Concrete Cylinder Pipe
PCS	Protected Coated Steel Pipe
PE	Polyethylene Pipe
PVC	Polyvinyl Chloride Pipe
RCP	Reinforced Concrete Pipe
UNK	Unknown

	Location
С	Crosses street centerline
Р	Parallel to street centerline

## Alternative 3 – Walnut Street

	Cro	oss St	reets			Wat						ary Sewe	r				Storm S KCIV				Sanita	ry & Sto		wer		Misso	Gas	s s & Enei	rgv	l	nilled Water a Energy		Electri KCP&			Co	ommun	ications	
Street	Street	to	Street	Size (in)	Score	Туре		Lengt	h Siz		ore T			ength (ft)	Size (in)	Score		Loc	Lengtl	n Size	Score	Туре		Length (ft)	Size (in)		Туре		Length	Score	Loc	Score			Score	Туре	Loc	Length	Owner
$\dashv$	7th St.	to	8th St.	12	2	CIP	Р	346	15	2	_	CP P		178	(,				(,	(,				(1-9)	24	3	CI	P	380			2						(-7	
ŀ									8 15	_	-	CP P	-	130 127																		2	UDG	P					
ŀ		+							15 8		-	CP P	-	51 52					-																				
İ	8th St.	to	9th St.	8	1	CIP	С	4.0	8	1	L \	CP P		34											24	3	CI	P	250			2	UDG	Р	1		С	43	TWC
ŀ				12 12	2	CIP	P P	12 299	8 12	_	_	CP P	_	92 118											24 24	3	PCS CI	C P	9 47						1		C P	336 318	TWC
ŀ		+		12 10	2	CIP	P C	32	12 15	_	_	CP C	_	37 156					-						12 24	3	PCS CI	C P	72 40						1		С	60	TWC
	9th St.	to	10th St.	12	2	CIP	Р	240	18	3	3 \	CP P		207						18	1	BRICK	Р	207	24	3	CI	Р	30	1	С	2	UDG	Р	1		С	470	AboveNe
ł		+		12 12	2	CIP	C P	6 84	12	-	_	CP C	_	158 206											24	3	CI	P	399						1		C P	179 180	TWC
		+		12 12	2	CIP	C P	5 92	-	-																													
	10th St.	to	11th St.	10	2	CIP	С	12	10		_	CP P	_	212											24	3	CI	Р	450	1	С	2	UDG	С	1		С	140	TWC
ŀ		+		6 12	2	CIP	C P	361	15	2	2 \	CP P		197																1	С	2	UDG	P	1		С	270	TWC
	11th St.	to	12th St.	6 12	1 2	CIP	C P	41 458	15 18	_	_	CP P	_	415 235						18 18		VCP VCP	P P	105 41	24	3	CI	Р	373			2	UDG UDG	C P	3	Axon	C C	274	Multiple
ŀ				12	2	CIP	P	438	18	3	, ,	CP P		233						18	1	VCP	P	41								2	UDG	С	1		С	198	TWC
ŀ		+							-																										1		P C	100 100	TWC
	401.0	1.1	4011.01								Ι.								100										100						1		Р	245	TWC
ŀ	12th St.	to	13th St.	12 10	2	CIP	C	8	12 18		_	CP C	_	53 350	18	1	VCP	С	132	18	1	VCP	P	77	12 4	2	PE PE	P P	480 378			2	UDG	P C	1		C C	80	AboveNe TWC
ŀ		++		16 16	3	DIP	P P	350 139	8 18	_	_	VC C		45 94					-	+					4 12	3	PCS PCS	_	8 77						1		C C	79 40	TWC
Ì							Ė	100	10	) 2	2 F	VC C		37												Ĭ													
ŀ		+							18 8	_	-	VC C	_	100 36						+																			
		$\blacksquare$							18 18		-	VC C	_	119 63																									
	13th St.	to	14th St.	12	_	DIP	С	38	12	2	2	С		40	18	1		С	52	36	2	BRICK	С	41	4	2	PCS	_	8	1	С	2	UDG	С	3	Axon	С		Multiple
alnut St.		+		12 12	2	DIP	P C	440	12		_	CP P	_	389 47	15 15	1		C	46 47	+					4	2	PCS PCS	P P	5 547			2	UDG	P C	1		C/P C/P	163 422	TWC
Wal									12	. 2	2	Р		80	15	1		С	46						12	3	PE	Р	443						1		C/P	412	TWC
ł		+							6 12		_	VC C	_	27 84	15	1		С	50						4	2	PCS	P	20				+		1		C/P C/P	320 150	TWC
		$\blacksquare$							6	1 2	_	VC C	-	32 59																					1		C/P C/P	175 415	TWC
ŀ	14th St.	to	I-35	12	2	DIP	Р	219			В В	RICK P	_	90	30	2		С	49						12	3	PCS	Р	50	1	С	2	UDG	С	1		P P	270	TWC
ŀ		+		12 24	_	DIP	P C	39	6 40	-		VC C	_	64 26	12 12			C	69 45						12 4	2			216 238						1		P C	318 60	TWC
									40	) 3	В В	RICK P		83	12			С	47						12	3	PCS		46						1		С	90	TWC
ŀ		+							40 6	_		VC C	_	21 43																									
		+							40 24	_	_	RICK P	_	61																									
İ	I-35	to	16th St.	12		CIP	С	50	66	-		NK P	_	451	42		RCP	_	94						16	3	_	_											
ŀ		+		10 8	1	CIP	P C	421	-	+			+		48 48	3	RCP RCP	P P	328 358	+					20	3		P	50 420										
Ī	16th St.	to to		10	_	CIP	P C	383	66	3	BI BI	RICK P		329	48 48	3	RCP	P P	480 435	36	_	BRICK		45 401	20	3	CI	P	400			_	OHD	+					
ŀ	17th St.	10	18111 51.	30 10		CIP	P	561							48	3	RCP	P	435	70 16	_	CIP	С	401	20 20	3	_	P P	280 330			2	UDG	C					
ŀ	18th St.	to	19th St.	12	2	CIP	С		+	+			+						+	66 66	3	BRICK	_	253 395	20	3	CI	P	500			2	UDG	С	1		С	1245	TWC
ļ				10	2	CIP	Р	74					$\perp$												16	3	_	С	20			1	OHD	_	1		С	80	TWC
ł				10 10	2	CIP	C P	24 387																															
-	19th St.	to	20th St.	4 10	_	CIP	C P	479	+	+			+					+		70	3	BRICK	P	523	20 20	3	CI	P P	20 26			1	OHD	Р					<u> </u>
				16	_	CIP	C	7/3		1															20	3	CI	Р	377										
ŀ	20th St.	to	Main St.												12	1	VCP	С	54						20	3	PCS	P	77			1	OHD	P	1		С	25	TWC
ļ			Union Station						-						15		RCP	_			3	BRICK	_	70								2	UDG	С	1		C P	115	TWC
ŀ		$\pm$																			1			72 204								2	UDG		1		P	394 41	TWC
-													+																			2	UDG	_	1		P P	192 70	TWC
										上																									1		P	38	TWC
			Total		78					9:	3					27					26					98				5		48			44				

	Types of Pipes
BRICK	Brick Pipe
CI	Cast Iron Pipe
CIP	Cast Iron Pipe
CU	Copper Pipe
DIP	Ductile Iron Pipe
PBS	Protected Bare Steel Pipe
PCCP	Prestressed Concrete Cylinder Pipe
PCS	Protected Coated Steel Pipe
PE	Polyethylene Pipe
PVC	Polyvinyl Chloride Pipe
RCP	Reinforced Concrete Pipe
JNK	Unknown

	Location
С	Crosses street centerline
P	Parallel to street centerline

## Alternative 4 – Baltimore Avenue

Π	Cross	s Str	eets			Wa					S	anitary KCN	Sewer			S	torm S				Sanita	ry & Sto		ver		Misso	Gas uri Gas		ρV		illed Water Energy		Electric			С	ommun	ications	
Street	Street	to	Street	Size			e Lo	ос	Length (ft)	Size (in)			Loc	Length	Size (in)	Score	Туре	I	Length	Size (in)	Score	1	l .	Length	Size (in)		Туре		Length (ft)	Score		Score	Туре		Score	Туре	Loc	Length	Owner
+	7th St.	to	8th St.	12		CIP	• Р	P	384	18		VCP	P	357	(,				(19	(,				(ii)	(,				(19	1	С				1		C P	365 373	TWC
ŀ																																							
Main St.	8th St.	to	9th St.	12 12		CIP	_	P P	38 284	18 24	_	VCP BRIC		150 150																		2	UDG	C P	1		C	205	TWC
Σ	9th St.	to	10th St.	12		CIP	_	С	14	30	_	VCP		61											3	1	PBS	Р	31			2	UDG	P	1		С		AboveNe
ŀ				12 12	2	CIP	Р	P P	104 285	42 42	3	BRIC	( P	223 235											10 8	3	CI	P C	35 115			2	UDG	С	1		P P	189 47	TWC
$\dashv$	Main St.	to	Baltimore Ave.	10	_	CIP	_	C P	42 270	18 12	2	VCP	Р	86 158						30	2	BRICK	С	45	10	3	CI	Р	111	1	Р	2	UDG	Р	1		P C	287 60	TWC
ŀ										12	2	VCP	P	95																1	P P				1		P	445	TWC
TOTAL ST.																																			1		C P	159 60 42	TWC
+																																			1 1 1		C	39 69	TWC TWC
ŀ																																			1		C	26 52	TWC
Ŧ	10th St.	to	11th St.	24 6		CIP	_	P P	531 480	12 15	_	VCP		203 210											4	2	PCS PCS	P P	56 149	1	Р	2	UDG		1		P C	154 100	TWC
F				6		CIP	_	c	13	12	_	VCP													4 8	2	PCS PCS	C	8										
ŀ																									8	3	PCS PCS	P C	213 16										
F	11th St.	to	12th St.	24 6		CIP	_	P P	258 279	15	2	VCP	P	127											8	3	PCS PCS	P P	102 194			2	UDG UDG	C C	1		C P	196 80	TWC
				12	2	DIP		С	11																2	1	PCS	С				2	UDG		1		C P	20 239	TWC TWC
ŀ	12th St.	to	13th St.	24 10	2	CIP	P	P P	417 411	12 15	2	VCP RCP	Р	49 90	4	1		C C	94 64						8	3	pcs PCS	P C	460 52	1	C P	2	UDG	Р	1		C	55	AboveNo TWC
ŀ				12	2	CIP	, ,	С	11	12		VCP		296	6	1		C	86 94						8	3	PCS	Р	45						1		C	270 269	TWC
ŀ	13th St.	to	14th St.	24	3	DIP		P	490	15	2		P	104											8	3	PCS	P	307	1	С	2	UDG	С	1		C	400	TWC
þ	1511131.	to	140130.	16 12	3	DIP	P	P P	254 233	8 15	1	PVC	_	23											8	3	PCS PCS	P P	153 40	1	P	2 2	UDG	P					
ŀ						-	_		200	15 15	2	PVC	Р	66												_				1	P P		000						
انو										15 18	2	VCP	Р	109 156																1	P P								
nore Ave	14th St.	to	I-35	20 12		PCC		C P	24 239	36 12		BRIC		58						36	2	RCP	С		4	2	PE	Р		1	С	2	UDG	С	1		C C	200 410	TWC
Baitin				24 24		CIP		P C	251 18	15 8	_	RCP PVC		135 77																									
ŀ										18	3	RCP	_	146 30																									
ŀ	I-35	to	16th St.	10	2	CIP	P	P P	517 347	15 12	2			225						15	1	BRICK	Р	225	6	2	PCS	P P	355 35			2	UDG	С	1		С	80	TWC
ŀ	16th St.	to	17th St.	24 12 24	2	DIP CIP		P C P	360 22 382	_	3			401 274	30	2	RCP	С	57						4	2	PCS CI	P P	11 315			2	UDG UDG	C C					
þ				8 24	1	CIP	P	P C	397 23	10	3	VCP	P	2/4											4	2 2	CI	P P	200			2	UDG						
ŀ	17th St.	to	18th St.	24		CIP		P	208	18	3	VCP	P	322	15	1	RCP	С	42						6	2	PE PE	C P	25			2	UDG	С					
F				30 8	3	CIP	Р	P P	227	12	2	VCP	С												4	2	PE PE	P C	305										
-				6 8		CIP	_	C P	64 305																														
ŀ	18th St.	to	19th St.	6 30	3	CIP	Р	C P	65											24	1	BRICK	Р	344	4	2	PE	Р	296										
-	19th St.	to	20th St.	6	1	CIP		P C	342 44	12	_														6	2	CI		50			2	UDG		1		С	25	TWC
-		H		30 16	3	CIP		/C C	450	24	3	BRIC	( P	158 157											6	2	CI		80 380			1	OHD	С	1		C	62 197	TWC
- 1	Baltimore Ave.	to	Main St.	6	-	CIP	_	P P	459 288	24	3	BRIC	( P	265							2	VCP BRICK	C P	163	6 16	3	CI PE	P P	25 350			1 2	OHD		3 1	Axon	P P	30 197	Multipl TWC
20th St.		H																		24	1	BRICK	-	103									500		1 1		C	100	TWC
+	20th St.	to	Union Station	6	1	CIP	, ,	P	467						15	1	RCP	С		240	3	BRICK	С		2	1	PE	С	96			2	UDG	С	1		P	130 115	TWC
ן יַּי				8		_	_	P	418												1		P	72	4	2	PE	P	403			2	UDG UDG	Р	1		P P	394 41	TWC
Main St.		Н				E														27	1	VCP	P	204								2	UDG	Р	1		P P	192 70	TWC
_[		ЦΤ	Total		95						93					8					14					86				15		56			1 50		Р	38	TWC

	Types of Pipes
BRICK	Brick Pipe
CI	Cast Iron Pipe
CIP	Cast Iron Pipe
CU	Copper Pipe
DIP	Ductile Iron Pipe
PBS	Protected Bare Steel Pipe
PCCP	Prestressed Concrete Cylinder Pipe
PCS	Protected Coated Steel Pipe
PE	Polyethylene Pipe
PVC	Polyvinyl Chloride Pipe
RCP	Reinforced Concrete Pipe
UNK	Unknown

	Location
С	Crosses street centerline
n	Develled to store to enterline

## Alternative 5 – Grand Avenue & Walnut Street

_											•								IIU AVE								I a								
<b>1</b>	Cros	ss Str	reets			Wate KCM			S	anitary : KCM				S	torm S KCM			Sanit	ary & Stori KCMO	n Sewe	er		Misso	Gas uri Gas	& Ener	gy	Steam/Chi Veolia			Electric KCP&L		C	ommuni	cations	
Street	Street	to	Street	Size (in)	Score	Туре	Loc	Length (ft)	Size (in) Score	Туре	Loc	Length (ft)	Size (in)	Score	Туре	Loc	Length (ft)	Size (in) Scor	е Туре	Loc	Length (ft)	Size (in)	Score	Туре	Loc	Length (ft)	Score	Loc	Score	Туре	Loc	Score Type	Loc	Length (ft)	Owner
	Missouri Ave.	to	Independence Ave.	6 12		CIP	P P	210	36 3	VCP	Р	188										2	1	PCS	Р	203	1	Р	2	UDG	Р	1 1	P C	56 99	TWC
	Independence Ave.	to	6th St.	12		CIF																					1	P	2	UDG	P	1		33	TVVC
	6th St.	to	Admiral Blvd.	6	1	CIP	Р	305																			1	С	2	UDG	С				
	Admind Blod		0+1- 0+	20		CIP	P	273	45 2	VCD		171											2	D.F.		220			2	UDG	P				
	Admiral Blvd.	to	8th St.	12 6	2	CIP	P P	342 308	15 2 15 2	VCP	P P	171 185										4	2	PE PE	P P	320 20			2	UDG	Р				
	8th St.	to	9th St.	12		CIP	P	347	15 2	VCP	Р	137	6	1	RCP	С		15 1	VCP	Р	34	4	2	PE	P	279			2	UDG	С	1	С	328	TWC
				6	1	CIP	P	347										15 1	VCP	Р	99	4	2	PCS	Р	29			2	UDG	Р	1	С	336	TWC
	9th St.	to	10th St.	10	2	CIP	C P	41 403	15 2	VCP	P	194						15 1	VCP	Р	37	2	1	PCS PCS	C P	42 70	1	С	2	UDG	P	1	P		AboveNet
	50150	10	1011131.	6	1	CIP	P	391	12 2	VCP	P	419										2	1	PCS	P	6	_			000		1			Aboverect
				10	2	CIP	С	30														2	1	PE	Р	336									
	10th St.	+-	11th St.	12	2	CIP	P	432	15 2	VCP	P	431										2	1	PCS PCS	P P	52 88			2	UDG	С	3 Axon	P		Multiple
	10th 5t.	to	11(1)51.	6	1	CIP	P	349	15 2	VCP	P	431							+ +			2	1	PCS	P	15			2	UDG	P	1 AXON	C	150	TWC
				8	1	CIP	С	70														2	1	PCS	Р	463						1	С	481	TWC
					_		_			=															_				_		_	1	С	730	TWC
	11th St.	to	12th St.	12 6		CIP	P P	389 382	18 3 15 2	VCP	P	422 465							+ +			4	2	PCS PE	P P	200 19	1	С	2	UDG	C P	1	C P	112 50	TWC
				10		CIP	c	31	15 2	VCP	C	46										8	3	PCS	C	30				000		1	C	72	TWC
																																1	Р	404	TWC
	12th St.	to	13th St.	8	1	CIP	P	436	18 3 8 1	VCP PVC	P C	225 71								_		8	3	PCS	Р	492						1	C	246	AboveNet TWC
								+	18 3	VCP	P	181																				1	-	240	
	13th St.	to	14th St.	16	3	DIP	С	34	24 3	VCP	Р	178						36 2	BRICK	С	71	6	2	PCS	Р	35	1	С	2	UDG	С				
									6 1	PVC	С	80										6	2	PE	P	446			2	UDG	Р				
		$\Box$						+	6 1 24 3	PVC VCP	C	76 46							+ +			4	2	PCS PCS	P P	30 10									
									6 1	PVC	P	33										-		1 00	i i	10									
									24 3	VCP	Р	103																							
Grand Ave.	14th St.	to	I-35	16	3	DIP	P	298	24 3 24 3	VCP	P	144 231										4	2	PE	P	225	1	С	2	UDG	С	3 Axon	С		Multiple
and,	140130.	10	1-55	24		DIP	C	43	8 1	PVC	С	82										4		PE	P	223	1	C	2	UDG	Р	3 AXUII			Multiple
ğ									24 3	VCP	Р	87																	2	UDG	С				
	1.25		454-54	10		CID		70	24 3	VCP	С	244											_			410				OUD				100	TIME
	I-35	to	16th St.	12 6	<del>                                     </del>	CIP	C P	72 325	24 3 36 3	VCP BRICK	P C	241										8 6	3	CI	P P	410 400			1	OHD	С	1	С	128	TWC
	16th St.	to	17th St.			CIP			24 3			368										8		CI	Р	420			1	OHD	С				
				6		CIP	P	950		1										_		6	2	CI	P	400			_		_				
	17th St.	to	18th St.	30 6	3	CIP	C P		24 3	VCP	Р	198						24 1 24 1			125 267	8 6		CI	P P	285 270			2	UDG	C				
					_	CII	<u> </u>											24 2	1	•	207	8		CI	P	60			2	UDG	P				
																						6	2	CI	Р	370									
																						8	3	CI	P P	37 257									
	18th St.	to	19th St.	12	2	CIP	С											24 1	VCP	Р	260	8		CI	P	400			2	UDG	С	1	С	1245	TWC
				6		CIP	Р	492										24 1	_	Р	255	6		CI	Р	11									
	101-01		201- 61	4		CIP	С	64					10		V/CD		-	24 4	WCD		220	6		PE	P	50							_	100	TIME
	19th St.	to	20th St.	4 16	3	CIP	P C	461 25					12	1	VCP	68	С	24 1 24 1			228 214	8 6	3	CI PE	P P	400 50						1	С	108	TWC
						-																	_												
	20th St.	to	21st St.		3		Р	171										183 3	BRICK	Р	533	6	2	PE	Р	300			2	UDG	С	1	С	25	TWC
		+		8	1	DIP	P	71		+									+	-		6 4	2	PE PE	C P	83 205			2	UDG	Р	1	C	25 25	TWC
	21st St.	to	Pershing Rd.	16	3	CIP	Р	181	183 3	BRICK	Р	148	12	1	VCP	Р	158	183 3	BRICK	С	78	4				203			2	UDG	С	1	С	20	TWC
			_										12		VCP	Р	144	60 3	VCP	С	83								2	UDG	Р	1	Р	41	TWC
		+			-	-		-		-					-						169 216				-				2	UDG	P	1	P	20	TWC
		+			<del>                                     </del>	+		+		+					$\vdash$			21 1 18 1			159				<del>                                     </del>				2	UDG	P C				
																													2	UDG	С				
	Pershing Rd.	to	Crown Center	8		CIP	С	55		1			15	1	RCP	С	49	15 1		_	105	6			P	192			2	UDG	С				
		++		16	3	CIP	Р	265		+			1		-			24 1 21 1		C P	64 90	6	2	_	P P	4 68			2	UDG	C P				<del>                                     </del>
								$\perp$		$\perp$									V CF		20	6		PCS	P	4				300					
																						6	2	PCS	Р	621									

	Types of Pipes
BRICK	Brick Pipe
CI	Cast Iron Pipe
CIP	Cast Iron Pipe
CU	Copper Pipe
DIP	Ductile Iron Pipe
PBS	Protected Bare Steel Pipe
PCCP	Prestressed Concrete Cylinder Pipe
PCS	Protected Coated Steel Pipe
PE	Polyethylene Pipe
PVC	Polyvinyl Chloride Pipe
RCP	Reinforced Concrete Pipe
UNK	Unknown

Location
Crosses street centerline
Parallel to street centerline

## Alternative 5 – Grand Avenue & Walnut Street cont.

	7th St.	to	8th St.	12	2	CIP	Р	346	15	2	VCP	Р	178											24	3	CI I	38	0		2	UDG	С	l			
									8	1	VCP	Р	130																	2		Р				
									15	2	VCP	Р	127																							
1		++							15	2	VCP	Р	51																						+	
1 F	Oak Ca		046.04		1	CID			8	1	VCP VCP	P P	52											24	2	CI				-	LIDG		1		42	TIME
1 F	8th St.	to	9th St.	8 12	2	CIP	C P	12	8	1	VCP	P	34 92														25			2	UDG	Р	1	C	_	_
l ⊦		+		12	2	CIP	P	299	12	2	VCP	P	118														9 4						1	P	318	
				12	2	CIP	Р	32	12	2	VCP	С	37											-			7						1	С		TWC
				10	2	CIP	С		15	2	VCP	С	156											24	3	CI I	4	0								
l ⊦	9th St.	to	10th St.	12	2	CIP	Р	240	18	3	VCP	Р	207						18	1	BRICK	Р	207				3		С	2	UDG	Р	1	С		AboveNet
l ⊦		++		12	2	CIP	C P	6 84	12 12	2	VCP VCP	С	158 206											24	3	CI I	39	9		_			1	C		
l ⊦		++		12 12	2	CIP	C	5	12	2	VCP	С	200																				1	P	180	TWC
l ⊦				12	2	CIP	P	92																											+	
	10th St.	to	11th St.	10	2	CIP	С		10	2	VCP	Р	212											24	3	CI I	4.5	0 1	С	2	UDG	С	1	С	140	TWC
				6	1	CIP	С		15	2	VCP	Р	197															1	С	2	UDG	Р	1	С	270	TWC
-  -				12	2	CIP	P	361				_										_			_					+-		_				
⊢	11th St.	to	12th St.	6 12	2	CIP	C P	41 458	15 18		VCP VCP	P P	415 235						18 18			P P	105 41	24	3	CI	3	3		2	UDG	C P	<del>                                     </del>	Axon C	274	Multiple
⊢		++		12		CIP	P	436	10	3	VCP	-	253						10	1	VCP	Ρ	41							2	UDG	С	1	С	274 198	
									1																					<u> </u>			1	P	100	_
																																	1	С		_
	· · ·			$\Box$							$\Box$													$\Box T$									1	P	245	
	12th St.	to	13th St.	12		DIP	С	8	12		VCP	С	53	18	1	VCP	С	132	18	1	VCP	Р	77	-			48			2	UDG	P	1	С		AboveNet
⊢		++		10 16	3	CIP	C P	350	18 8	3	VCP PVC	P C	350 45														37			2	UDG	С	1	C	80 79	_
⊢				16	3	DIP	P	139	18	3	VCP	P	94														7						1	C	40	
					Ĺ		Ľ		10	2	PVC	C	37												_ †								Ĺ		<u> </u>	
									18	3	VCP	Р	100																						1	
L									8	1	PVC	С	36																							
⊢									18	3	VCP	P	119															-							+-	
$\vdash$	13th St.	to	14th St.	12	2	DIP	С	38	18 12	3	PVC	C C	63 40	18	1		С	52	36	2	BRICK	<u> </u>	41	4	2 P	PCS I	) {	1	С	2	UDG	С	3	Axon C	+	Multiple
St.	150150	-	140150	12	2	DIP	P	440	12	2	VCP	Р	389	15	1		С	46	30		Diticit		71				, ;			2	UDG	P	1	C/P	163	
Walnut				12	2	DIP	С		12	2		Р	47	15	1		С	47									54	_		2	UDG	С	1	C/P		
Wa									12	2		Р	80	15	1		С	46						12	3	PE I	4/						1	C/P		
⊢				$\vdash$					6	1	PVC	С	27	15	1		С	50						4	2 P	PCS I	2	0		_			1	C/P		_
⊢									12 6	2	PVC	P C	84 32																				1	C/P C/P		
⊢									12	2	PVC	р	59																				1	C/P		
⊢	14th St.	to	I-35	12	2	DIP	Р	219	40		BRICK	P	90	30	2		С	49						12	3 P	PCS I	5	0 1	С	2	UDG	С	1	P	270	
				12	2	DIP	Р	39	6	1	PVC	С	64	12	1		С	69						12	3	PE I	2:	.6					1	P	318	TWC
⊢				24	3	DIP	С		40		BRICK	Р	26	12	1		С	45								PE I							1	С	60	TWC
⊢									40		BRICK	P	83	12	1		С	47						12	3 P	PCS I	4	5					1	С	90	TWC
⊢		++							40 6	3	BRICK	P C	21 43																						+-	
		++							40	3	BRICK	Р	61																						+-	
									24	3	RCP	С																								
	I-35	to	16th St.	12		CIP		50	66	3	UNK	Р	451	42	2	RCP	С	94							3 P		29									
F		++		10	2	CIP	P	421	+		+			48	3	RCP	P	328	-					-		CI I	_			_			<u> </u>		+-	
⊢	16th St.	to	17th St.	8 10	2	CIP	C P	383	66	2	BRICK	P	329	48 48	3	RCP RCP	P P	358 480	36	2	BRICK	С	45	-			9 42			1	OHD	С			+-	
├	17th St.	to	18th St.	30	3	CIP	С	303	100		BATCK		523	48	3	RCP	P	435	70			Р	401	-			28	_		2		С			+	+
				_	2	CIP		561											16			С		20			33									
																			66			Р	253												$\perp =$	
	18th St.	to	19th St.	_	2	CIP			-		+								66	3	BRICK	Р	395	20			50	_		2		С	1	С		
⊢				10 10	2	CIP	P C	74 24			+			$\vdash$					-	$\vdash$				16	3	CI (	2	U		1	OHD	С	1	С	80	TWC
$\vdash$		++		10	2	CIP	_	387	+		+	-+													_								$\vdash$		+	
	19th St.	to	20th St.	4		CIP	С												70	3	BRICK	Р	523	20	3	CI I	2	0		1	OHD	Р			$\perp$	
				10		CIP	Р	479																-	3 P	PCS I	2	5								
L				16	3	CIP	С																	-			3									
F	acil ci		14 : 0:						1							1405								20	3 P	PCS I	7	7		-	0117	_	_	_		
-	20th St. Main St.	to	Main St. Union Station						+		+ +			12 15	1	VCP RCP	C C	54	240	9	BRICK				_					2	OHD	P C	1	C		
	iviaiii 3t.	10	Omon Station	$\vdash$				1	+		+			10	1	NCP	·		27			P	72	$\vdash$	_					2	UDG	P	1	P	394	<del>-  </del>
一		+							1										27	_		P	204							2	UDG	C	1	P	41	
																														2	UDG	Р	1	Р	192	_
											$\perp \perp \uparrow$	$\Box$								$\Box$										2	UDG	Р	1	P	70	
																																	1	P	38	TWC
			Total		145					162					32					52					189			12		114			73			

	Types of Pipes
BRICK	Brick Pipe
CI	Cast Iron Pipe
CIP	Cast Iron Pipe
CU	Copper Pipe
DIP	Ductile Iron Pipe
PBS	Protected Bare Steel Pipe
PCCP	Prestressed Concrete Cylinder Pipe
PCS	Protected Coated Steel Pipe
PE	Polyethylene Pipe
PVC	Polyvinyl Chloride Pipe
RCP	Reinforced Concrete Pipe
UNK	Unknown

	Location
С	Crosses street centerline
P	Parallel to street centerline

## Alternative 6 – Walnut street & Main Street

L	Cros	ss Str	eets			Wate KCM				5	anitary KCIV				Storm S KCM				Sanita	y & Sto KCM	orm Sev O	ver		Missou	Gas uri Gas			Steam/Chi Veolia			Electric KCP&L			Co	mmuni	cations	
	Street	to	Street	Size (in)	Score	Туре	Loc	Lengt (ft)	h Siz		е Туре	Loc	Length (ft)	Size (in)	Score Type	Loc	Length (ft)	Size (in)	Score	Туре	Loc	Length (ft)	Size (in)	Score	Туре	Loc	Length (ft)	Score	Loc	Score	Туре	Loc	Score	Туре	Loc	Length (ft)	Owner
	7th St.	to	8th St.	12	2	CIP	Р	346	_		_		178										24	3	CI	Р	380			2	UDG	С					
$\vdash$									15		VCP		130 127																	2	UDG	P	-				
$\vdash$									15		VCP		51																								
									8		VCP	+	52																								
$\vdash$	8th St.	to	9th St.	8 12	2	CIP	C P	12	8	_	VCP	_	34 92										24	3	CI PCS	P C	250 9			2	UDG	Р	1		С	43 336	TWC
				12	2	CIP	P	299	12		VCP	P	118										24	3	CI	Р	47						1		Р	318	TWC
				12	2	CIP	P	32	12				37										12	3	PCS	С	72						1		С	60	TWC
$\vdash$	9th St.	to	10th St.	10 12	2	CIP	C P	240	15		VCP		156 207					18	1	BRICK	P	207	24 24	3	CI	P P	40 30	1	С	2	UDG	P	1		С		AboveN
				12	2	CIP	С	6	12			_	158										24	3	CI	Р	399	_					1		С	179	TWC
$\vdash$		$\vdash$		12	2	CIP	P	84	12	2 2	VCP	С	206																				1		Р	180	TWC
$\vdash$		$\vdash$		12 12	2	CIP	C P	5 92	+	+																											
	10th St.	to	11th St.	10	2	CIP	С		10	) 2	VCP	Р	212										24	3	CI	Р	450	1	С	2	UDG	С	1		С	140	TWC
$\vdash$				6	1	CIP	С		15	2	VCP	Р	197															1	С	2	UDG	Р	1		С	270	TWC
$\vdash$	11th St.	to	12th St.	12 6	2	CIP	P C	361 41	15	5 2	VCP	P	415					18	1	VCP	P	105	24	3	CI	Р	373			2	UDG	С	3	Axon	С		Multiple
				12		CIP	Р	458	_		VCP	+	235					18	1	VCP	Р	41								2	UDG	Р	1		С	274	TWC
									$\perp$																					2	UDG	С	1		С	198	TWC
$\vdash$									+		+																						1		P C	100	TWC
																																	1		Р	245	TWC
	12th St.	to	13th St.	12	2	DIP	С	8	12				53	18	1 VCP	С	132	18	1	VCP	Р	77	12	3	PE	Р	480			2	UDG	Р	1		С		AboveN
$\vdash$		$\vdash$		10 16	3	CIP	C	350	18		VCP PVC		350 45										4	2	PE PCS	P P	378 8			2	UDG	С	1		C C	80 79	TWC
				16	3	DIP	P	139			VCP		94										12	3	PCS	P	77						1		С	40	TWC
									10		PVC	С	37																								
H									18	3 1	VCP PVC		100 36																								
$\vdash$									18		VCP		119																								
									18		PVC		63																								
	13th St.	to	14th St.	12 12	2	DIP	C P	38 440	12		VCP	C P	40 389	18 15	1	C C	52 46	36	2	BRICK	С	41	4	2	PCS PCS	P P	8 5	1	С	2	UDG	C P	3 1	Axon	C C/P	163	Multiple
$\vdash$				12	2	DIP	C	440	12		VCP	P	47	15	1	С	47						4	2	PCS	P	547			2	UDG	С	1		C/P	422	TWC
									12			Р	80	15	1	С	46						12	3	PE	Р	443						1		C/P	412	TWC
$\vdash$									12		PVC	C	27 84	15	1	С	50						4	2	PCS	Р	20						1		C/P	320 150	TWC
									6	_	PVC		32																				1		C/P	175	TWC
									12			р	59																				1		C/P	415	TWC
$\vdash$	14th St.	to	I-35	12	2	DIP		219	_		BRICK		90	30	2	С	49						12	3	PCS		50	1	С	2	UDG	С	1		P	270	TWC
$\vdash$					3	_	P C	39	40		BRICE		64 26	12 12		C C	69 45						12 4	2	PE PE	P	216 238						1		P C	318 60	TWC
									40		BRICK		83		1	С	47						12		PCS	Р	46						1		С	90	TWC
$\vdash$		$\vdash$							40				21																								
									40	_	BRICE		43 61																								
									24	3		_																									
$\vdash$	I-35	to	16th St.	12 10		CIP	C P	50 421	66	3	UNK	Р	451	42 48	2 RCP 3 RCP	C P	94 328						16 20	3	PCS CI	P P	290 50										
$\vdash$					1	CIP	C	421	+		+			48	3 RCP	P	358						20	3	CI	P	420										
		to	17th St.	10	2	CIP	Р	383	66	5 3	BRICK	Р	329	48	3 RCP	Р	480	36		BRICK	С	45	20	3	CI	Р	400			1	OHD						
$\vdash$	17th St.	to	18th St.	30	2	CIP	C	561	+		+			48	3 RCP	Р	435	70 16		BRICK CIP		401	20	3	CI	P P	280 330			2	UDG	С					
				10		CIP	P	301	+											BRICK	C P	253	20	3	CI	Р	330										
	18th St.	to	19th St.	12	2	CIP	С											_	3		Р	395	20		CI	Р	500			2	UDG	С	1		С	1245	TWC
$\vdash$				10		CIP	P		+														16	3	CI	С	20			1	OHD	С	1		С	80	TWC
$\vdash$				10		CIP	C P		+	+																											
	19th St.	to	20th St.	4	1	CIP	С											70	3	BRICK	Р	523	20		CI	Р	20			1	OHD	Р					
$\vdash$					2	CIP	P	479	+	+		1											20				26										
$\vdash$		+		16	3	CIP	С		+	+													20	3	CI PCS	P P	377 77										
	20th St.	to	Main St.						上					12	1 VCP	С	54							-		-				1	OHD	Р	1		С	25	TWC
	Main St.	to	Union Station						$\perp$	4		1		15	1 RCP	С			_	BRICK										2	UDG	С	1		С	115	TWC
$\vdash$		+							+	+		1						27 27	1	VCP VCP	P P	72 204								2	UDG	P C	1		P P	394 41	TWC
		+				_	+	+	+	+	+	1									<u> </u>	204	$\vdash$								_				Р	192	TWC
																											I			2	UDG	P	1			132	1110

	Types of Pipes
BRICK	Brick Pipe
CI	Cast Iron Pipe
CIP	Cast Iron Pipe
CU	Copper Pipe
DIP	Ductile Iron Pipe
PBS	Protected Bare Steel Pipe
PCCP	Prestressed Concrete Cylinder Pipe
PCS	Protected Coated Steel Pipe
PE	Polyethylene Pipe
PVC	Polyvinyl Chloride Pipe
RCP	Reinforced Concrete Pipe
UNK	Unknown

	Location
С	Crosses street centerline
P	Parallel to street centerline

## Alternative 6 – Walnut street & Main Street cont.

	7th St.	to	8th St.	12	2	CIP	Р	384	18	3	VCP	Р	357						1					l					1	С				1		С	365	TWC
																																		1		Р	373	TWC
	8th St.	to	9th St.	12	2	CIP	Р	38	18	3	VCP	Р	150																		2	UDG	С	1		С	205	TWC
Γ				12	2	CIP	Р	284	24	3	BRICK	Р	150																		2	UDG	Р	1		С		TWC
	9th St.	to	10th St.	12	2	CIP	С	14	30	3	VCP	С	61											3	1	PBS	Р	31			2	UDG	Р	1		С		AboveNet
Γ				12	2	CIP	P	104	42	3	BRICK	Р	223											10	3	CI	Р	35						1		Р	189	TWC
				12	2	CIP	Р	285	42	3	BRICK	Р	235											8	3	CI	С	115						1		Р	47	TWC
				10	2	CIP	С	42	18	3	VCP	С	86											10	3	CI	P	111						1		P	287	TWC
	10th St.	to	11th St.	12	2	CIP	P	199	30	3	BRICK	Р	374											4	2	PE	С		1	С	2	UDG	С	1		С	60	TWC
				12	2	CIP	P	224																4	2	PE	Р	108	1	Р	2	UDG	Р	1		Р	40	TWC
				6	1	CIP	С	44																4	2	PE	P	261	1	Р	2	UDG	С	1		P	445	TWC
	11th St.	to	12th St.	12	2	CIP	P	112	30	3	BRICK	P	294																1	Р	2	UDG	С	3	Axon	P		Multiple
				12	2	CIP	P	266																					1	Р	2	UDG	Р	3	Axon	Р		Multiple
L		Ш		16	3	CIP	С																						1	Р	2	UDG	С	3	Axon	Р		Multiple
L																															2	UDG	Р	1		С	274	TWC
L																															2	UDG	С	1		P	158	TWC
L	12th St.	to	13th St.	16	3	DIP	P	472	12	2	VCP	Р	32						<u> </u>										1	P				1		С		AboveNet
L									12	2	VCP	P	58																1	P				3	Axon	P		Multiple
L									12	2	VCP	Р	296						<u> </u>							1			1	P				3	Axon	Р		Multiple
		$\perp$		<u> </u>					$\sqcup$					$\perp$					1					<u> </u>				1						1		С	296	TWC
<u> </u>		$\perp \perp \mid$		<u> </u>		1			$\sqcup$					$oxed{oxed}$					1					<u> </u>				1						1	1	Р	401	TWC
		$\perp$		<b>└</b>					$\sqcup$					L					1					ऻ				1			<u> </u>			1		P	80	TWC
	13th St.	to	14th St.	₩	1	-			15	2	VCP	Р	196	42	2	DIP	P	195	1					ऻ—				-	1	С	2	UDG		3	Axon	P		Multiple
		+		├	_	-	-		15	2	VCP	Р	180	42	2	DIP	P	48	1		-			├				-			2	UDG	Р	3	Axon	P		Multiple
		+		<del>                                     </del>	1	1	-		$\vdash$					24	1		С	37	1	-				-				1			<u> </u>	1		3	Axon	P		Multiple
		+		₩	1	1	-		$\vdash$					15	1		С	39	1					├				1			-	1		3	Axon	P	-	Multiple
		$\perp$												42	2	DIP	P	225	1															3	Axon	P		Multiple
		+												24	1		С	37	$\vdash$							-								3	Axon	P		Multiple
-		+		_			-							_					$\vdash$					-		-								1		С	80	TWC
		+					-												+									-						1		P C/D	515	TWC
١., ١		+					+							$\vdash$					+					-				+						1		C/P	415	TWC
n St.		+																	$\vdash$					-										1		C/P P	410	TWC
Main	14th St.	to	I-35						24	3	PVC	P	126	$\vdash$					36	2	BRICK	С		4	2	PCS	P	24	1	С	2	UDG	P	3	Axon	P	308	TWC Multiple
-	1411131.	10	1-55				1		18	3	PVC	C	38						30		BRICK	C		4	2	PE	P	94	1	-		UDG	Р	3	Axon	P		Multiple
l ⊦		+							24	3	PVC	P	110						+-					4	2	PE	P	133						3	Axon	P		Multiple
		+							6	1	PVC	C	41						+					2	1	PE	C	36						3	Axon	P		Multiple
		+							24	3	PVC	P	107						1					2	1	PE	P	4						3	Axon	P		Multiple
		+					<u> </u>		24	3	RCP	C	10,						1					2	1	PE	P	144						3	Axon	P		Multiple
		$\top$																	1					<u> </u>										1	- TAKON	P	308	TWC
	I-35	to	16th St.	12	2	CIP	С		15	2	VCP	С							1					10	3	CI	Р	440			2	UDG	Р	3	Axon	Р		Multiple
				10	_	CIP	Р	469																							2	UDG	С	3	Axon	Р		Multiple
																																		1		С	370	TWC
	16th St.	to	17th St.	8		CIP	С	29	15	2	VCP	Р	354						24	1	VCP	С		10	3	CI	Р	412			2	UDG	С	3	Axon	Р		Multiple
					2			976																6	2	CI	Р								Axon	Р		Multiple
		$\Box$		30			С																	6	2	CI	Р	33							Axon	Р		Multiple
[				4	1	CIP	С	71																6	2	CI	С	2						3	Axon	Р		Multiple
		$\Box$																						6	2	CI	С	7						3	Axon	Р		Multiple
		$oxedsymbol{oxedsymbol{\square}}$							oxdot															8	3	CI	С	11						3	Axon	Р		Multiple
		$\perp \! \! \perp \! \! \! \perp \! \! \! \! \! \! \! \! \! \! \! \!$							$oxed{oxed}$																									1		С	50	TWC
L	17th St.	to	18th St.	10		CIP			$\sqcup$										18	_	VCP	Р	282	_	3	CI	p	+				1		_	Axon			Multiple
		$\perp \!\!\! \perp \!\!\! \perp$		12		CIP		51	$\sqcup$					$oxed{oxed}$					18	_	VCP	Р	304	10		CI	P					1		+	Axon	Р		Multiple
	18th St.	to	19th St.	16		CIP	P	449	$\sqcup$					$\perp$					60		BRICK		362	10		CI	Р	400			<u> </u>	1		+	Axon	Р		Multiple
		$\perp$		4	1	CIP	С	50	$\sqcup$					<u> </u>					60	3	BRICK	Р	81	12		PCS	С				<u> </u>	1		+	Axon		1	Multiple
L		$\perp \perp$		<u> </u>	1	1								<u> </u>					1					12			P				<u> </u>	1		+	Axon	P		Multiple
L		+		₩	1	-	-		$\vdash$					_					1					4	2	PE	P	98			<u> </u>	1		+	Axon	P		Multiple
L		+		<u> </u>	1	-			$\vdash$					_					1					<u> </u>								1		1	1	С	327	TWC
	19th St.	to	20th St.	16	3	CIP	P	439	$\vdash$					<b>—</b>					24	1	BRICK	С		4	2	PE	Р	487			_	UDG	_	3	Axon	Р		Multiple
	2011 -:	4.		<del>  -</del>	-		-		$\vdash$		1		-	-			_	-	1	-				<del>  -</del>	<u> </u>		-		<b> </b>		2	_		<del>                                     </del>	1	_		
-	20th St.	to	Union Station	6		CIP		467	$\vdash$				_	15	1	RCP	С		_	_	BRICK			2		PE	С	+	-			UDG		1	1	С		TWC
F		+		8	1	CIP	P	418	$\vdash$					_					27		VCP	P	72	4	2	PE	Р	403	ļ		2	_		1	1	P	394	TWC
<b> </b>		+		$\vdash$	1	1	-		$\vdash$					_					27	1	VCP	Р	204	$\vdash$			-	1				UDG		1	1	P	41	TWC
		+		$\vdash$	1	1	-		$\vdash$					1					1					-				+			2		_	1	1	P	192	TWC
		+		$\vdash$	+	1	+		$\vdash$				-	-					1					$\vdash$	-			+						1	1	P	70	TWC
																																UDG	Р	1		P	38	TWC
			Total		131					150					37					43					162				17		98			172				

	Types of Pipes
BRICK	Brick Pipe
CI	Cast Iron Pipe
CIP	Cast Iron Pipe
CU	Copper Pipe
DIP	Ductile Iron Pipe
PBS	Protected Bare Steel Pipe
PCCP	Prestressed Concrete Cylinder Pipe
PCS	Protected Coated Steel Pipe
PE	Polyethylene Pipe
PVC	Polyvinyl Chloride Pipe
RCP	Reinforced Concrete Pipe
UNK	Unknown

	Location
С	Crosses street centerline
P	Parallel to street centerline

## Alternative 7 – Main Street & Baltimore Avenue

Ţ	Cr	oss Str	reets			Wat					Si	anitary :				9	itorm S				Sanita	ry & Sto		wer		Misso	Gas ouri Gas		gv	Steam/Chi Veolia	illed Water Energy		Electric			С	ommun	nications	į
Stree	Street	to	Street	Size (in)					ength (ft)	Size (in)	Score	Туре		Length (ft)	Size (in)	Score		Loc	Length (ft)	Size (in)	Score	Туре		Length (ft)	Size (in)		Туре		Length	Score	Loc	Score			Score	Туре	Loc	Length (ft)	Owner
	7th St.	to	8th St.	12	2	CIP	Р		384	18	3	VCP	Р	357																1	С				1		С	365	TWC
	8th St.	to	9th St.	12	2	CIP	P		38	18	3	VCP	P	150					-	+					╀							2	UDG	С	1		P C	373 205	TWC
	otii st.	10	Jui 31.	12		CIP	_	_	284	24	3	BRICK	P	150					<u> </u>						<u> </u>							2	UDG	Р	1		С	203	TWC
	9th St.	to	10th St.	12		CIP			14	30	3	VCP	С	61											3	1	PBS	Р	31			2	UDG	Р	1		С		AboveNet
				12		CIP		_	104	42	3	BRICK	P	223								-			10	3	CI	P	35						1		P	189	TWC
				12 10		CIP			285 42	42 18	3	BRICK	P C	235 86					+						10	3	CI	C P	115 111						1	+	P P	47 287	TWC
	10th St.	to	11th St.	12	_	CIP			199	30	3	BRICK	Р	374											4	2	PE	С		1	С	2	UDG	С	1		С	60	TWC
				12		CIP			224																4	2	PE	Р	108	1	P	2	UDG	Р	1		Р	40	TWC
	11th St.	to	12th St.	6 12	_	CIP	_	-	44 112	30	2	BRICK	P	294					-						4	2	PE	Р	261	1	P P	2	UDG	C	3	Axon	P	445	TWC Multiple
	1111131.	10	1211131.	12		CIP		_	266	30	3	BRICK	P	234											<del> </del>					1	P	2	UDG	Р	3	Axon		+	Multiple
				16	3	CIP	С																							1	Р	2	UDG	С	3	Axon	Р		Multiple
		++		_	+														-						<u> </u>							2	UDG	P	1	-	С	274	TWC
	12th St.	to	13th St.	16	3	DIP	P		472	12	2	VCP	P	32					+	+					<del> </del>					1	р	2	UDG	С	1	_	P C	158	TWC AboveNet
	120100	-	150150	10	-	- DIII	<del>                                     </del>		4/2	12	2	VCP	P	58											<u> </u>					1	P				3	Axon		+	Multiple
										12	2	VCP	Р	296																1	Р				3	Axon	Р		Multiple
		++			+		-							-					-	+		-			$\vdash$										1		C P	296	TWC
		++			+		+	_												+					$\vdash$										1	_	P	401 80	TWC
	13th St.	to	14th St.							15	2	VCP	Р	196	42	2	DIP	Р	195											1	С	2	UDG	С	3	Axon			Multiple
										15	2	VCP	Р	180	42	2	DIP	Р	48													2	UDG	Р	3	Axon			Multiple
		++													24 15	1		C	37 39						-										3	Axon	P	+	Multiple Multiple
		+			+										42	2	DIP	P	225						<del> </del>										3	Axon	<del>-</del>	+-	Multiple
															24	1		С	37																3	Axon	Р		Multiple
		++		_	+														-						<u> </u>										1	-	С	80	TWC
		++		$\vdash$	+														+						1										1	_	P C/P	515 415	TWC
St.																																			1		C/P	410	TWC
Main																																			1		Р	308	TWC
2	14th St.	to	I-35		+					24 18	3	PVC	P C	126 38					+	36	2	BRICK	С		4	2	PCS PE	P P	24 94	1	С	2	UDG	Р	3	Axon	_		Multiple Multiple
					+					24	3	PVC	P	110					+						4	2	PE	P	133						3	Axon	<del>-</del>	+	Multiple
										6	1	PVC	С	41											2	1	PE	С	36						3	Axon	Р		Multiple
		$\perp$			+					24	3	PVC	P	107											2	1	PE	P	4						3	Axon			Multiple
		++			+					24	3	RCP	С						+	1					2	1	PE	Р	144						1	Axon	P	308	Multiple TWC
	I-35	to	16th St.	12	2	CIP	С			15	2	VCP	С												10	3	CI	Р	440			2	UDG	Р	3	Axon		- 500	Multiple
				10	2	CIP	Р		469																							2	UDG	С	3	Axon	_		Multiple
	16th St.	to	17th St.	8	1	CIP	С		29	15	2	VCP	P	354					-	24	1	VCP	С		10	3	CI	P	412			,	UDG	С	3	Axon	C P	370	TWC Multiple
	1001130	10	1711131.	10	_	CIP		_	976	13		VCF		334						24	_	VCF			6	2	CI	P	9				000		3	Axon	_	+-	Multiple
				30	3	CIP	_																		6	2	CI	Р	33						3	Axon	_		Multiple
		+		4	1	CIP	С		71										-			-			6	2	CI	С	2						3	Axon		<del> </del>	Multiple
		++			+														+						6 8	3	CI	C	7						3	Axon		_	Multiple Multiple
																									Ť		-								1	- TACIT	С	50	TWC
	17th St.	to	18th St.	10		CIP		_												18	1	VCP	_	282	10	3	CI	р	260						3	Axon			Multiple
	18th St.	to	19th St.	12 16		CIP			51 449										-	18 60	3	VCP BRICK	_	304 362	10	3	CI	P P	350 400						3	Axon	_		Multiple Multiple
	1011131.	10	150150	4		CIP	_	-	50										+	60		BRICK	_	81	10 12	3	PCS	C	13						3	Axon	_	+	Multiple
																									12	3	PCS	Р	92						3	Axon	<del>                                     </del>		Multiple
		++		_	1		-	$\perp$				-		-					-	1					4	2	PE	Р	98						3	Axon		207	Multiple
	19th St.	to	20th St.	16	3	CIP	P		439			+								24	1	BRICK	С		4	2	PE	P	487			2	UDG	С	3	Axon	C P	327	TWC Multiple
	250130		250150	10		CIF														1		Smek			Ţ			Ľ.	707			2	UDG	P		HAVII			artiple
	20th St.	to	Union Station	6		CIP	_	-	467						15	1	RCP	С		240		BRICK	_		2	1	PE	С	96			2	UDG	С	1		С		TWC
		++		8	1	CIP	P	-	418			-		_					+	27 27	1	VCP	+	72	4	2	PE	Р	403			2	UDG	С	1	+	P P	394	TWC
		++		$\vdash$			+	+				+	-	+		-			+	12/	1	VCP	Ρ	204	$\vdash$							2	UDG	P C	1	+	P	41 192	TWC
																																2	UDG	P	1		P	70	TWC
																																2	UDG	Р	1		Р	38	TWC

	Types of Pipes
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PCS	Protected Coated Steel Pipe
PE	Polyethylene Pipe
PVC	Polyvinyl Chloride Pipe
RCP	Reinforced Concrete Pipe
UNK	Unknown

	Location
С	Crosses street centerline
Р	Parallel to street centerline

#### Alternative 7 – Main Street & Baltimore Avenue cont.

The color of the		Main St.	to	Baltimore Ave.	10	2	CIP	Р	270	12	2	VCP	Р	158						30	2	BRICK	С	45						1	Р	2	UDG	Р	1		С	60	TWC
TATION OF THE PROPERTY OF THE		man se	-	buttimore Ave.	-10			<u> </u>	2,0	•											_	Bruck	_	-10								1	1000		_				TWC
The color of the			+							12	-	VCI		- 55								+										1			+				TWC
The content of the	1 1								+	<u> </u>										1											-	+			_				TWC
1905    10   190	ايدا							1		-												1										-			_				
1905    10   190	≆						-		-		-				$\vdash$					_					$\vdash$							-			+				TWC
1985   1986	1 2									<u> </u>					$\vdash$										$\vdash$							1			+				TWC
Second   S	1 1																																		1		С	39	TWC
200   100	1 1																																		1		P	69	TWC
No.   State	1 1																															1			1		С	26	TWC
Fig.   Fig.	1 1																																		1		Р	52	TWC
The color of the	$\Box$	10th St.	to	11th St.	24	3	CIP	Р	531	12	2	VCP	Р	203											4	2	PCS	Р	56	1	Р	2	UDG	С	1		Р	154	TWC
Fig.   Fig.	1 1		+				_			_															1 -						-	_		D	_				TWC
THE STATE OF THE S	1 1						_			_				210											1				_				000	-	+ +		C	100	TVVC
110   110	1 1		+		0	1	CIP	C	15	12		VCP	C							1					<del>                                     </del>							+			1				
1119   10   1119   10   1119   1199   1119   1119   1119   1119   1119   1119   1119   1119   1119	1 1		+					-	-	-	-				$\vdash$					-		_			+ -			_				+			1				
Fig.   Fig.	1 1		+				-	-	-	ļ	-									_					_		_					1			1				
Fig.   Fig.																									8	3	PCS	С	16			1			1				
## Company No. 12   2   000   C   11   0   0   0   0   0   0   0   0	1 1	11th St.	to	12th St.	24	3	CIP	P	258	15	2	VCP	P	127											8	3	PCS	P	102			2	UDG	С	1		С	196	TWC
1399   1399					6	1	CIP	P	279																8	3	PCS	P	194			2	UDG	С	1		P	80	TWC
1399   1399			$\Box$		12	2	DIP	С	11																2	1		С				2	UDG	Р	1		С	20	TWC
The control of the co			$\top$																																_				TWC
## Section   Sec		12th St	to	13th St	24	3	CIP	P	417	12	2	VCP	p	49	4	1		C	94	T		1			8	3	ncs	P	460	1	С	2	UDG	P	+				AboveNet
## A PART OF COLUMN STATE OF C		ZZUI JU	1.0	250150			+	+		_	+									$\vdash$		1			_		_					<u> </u>	350	<u> </u>	+			55	TWC
## STATE   STA			++				_	+												$\vdash$		1			1 -				_	1	-	$\vdash$	+		1				<del> </del>
## 19   1   2   2   2   2   2   2   2   2   2			+		12		CIP	<u> </u>	11	_				296						$\vdash$		1	-		ŏ	3	PCS	P	45			1			_				TWC
310.51. 10 340.95. 2   0   0   0   0   0   0   0   0   0			+				1	1		12	2	VCP	С		6	1		С	94	1		1			$\vdash$							1			_				TWC
388 St. 10 1249 St. 24 3 0 00 P 440 10 2 P 50 P 450 10 2 P 50 P 450 P 50 P 450 P 50 P 450 P 50 P			+					1		<u> </u>										_					$\vdash$								1		+				TWC
## 1			$\perp$																													<u> </u>			1		С	40	TWC
Fig.   Fig.	1 1	13th St.	to	14th St.	24	3	DIP	P	490	15	2		P	104											8	3	PCS	P	307	1	С	2	UDG	С					
## PAPER PROPRIES   P. C. 19   15   2   P. 66   P. 109	1 1				16	3	DIP	P	254	8	1	PVC	С	23											8	3	PCS	P	153	1	Р	2	UDG	P					
## 1415   1					12	2	DIP	Р	233	15	2		Р	62											4	2	PCS	P	40	1	Р	2	UDG	С					
## Althorn   1	1 1									15	2		Р	66																1	Р								
## Althorn   1	1 1									15	2	PVC	С	26																1	Р								
Formal Part	1 1									_																					P	1							
## September   14th September   15th Sep	ایرا		+							_		VCD																				1			1				
Second   1.5	A A	1/1+h C+	to	1.25	20	2	DCCD	-	24	_		_		150						26	2	PCD	-		4	2	DE	D				2	LIDG	-	1		-	200	TWC
Fig.   Fig.	밑	140130	10	1-33			_			_	_	_		EO						30		INCF			-		FL	-		1			000		_				TWC
Fig.   Fig.	Ĕ						_			_	_									-		-										+			1		C	410	TWC
Fig.   Fig.	ة		+				_	_		_												-										1			1				
1-35   10   16h St.   20   3   50   70   70   70   70   70   70   70	<del>"</del>		$\perp$		24	3	CIP	С	18	+	_	PVC								_												1			1				
1-35   10   36th St.   20   3   PCCP   P   517   15   2   VCP   P   225   N   N   N   N   N   N   N   N   N			$\perp$							_	_		Р																										
Second   S										18	3	RCP	С	30																									
Third   Fig.		I-35	to	16th St.	20	3	PCCP	P	517	15	2	VCP	P	225						15	1	BRICK	P	225	6	2	CI	P	355			2	UDG	С	1		С	80	TWC
16th St. to 17th St. 12					10	2	CIP	P	347	12	2	VCP	С												6	2	PCS	P	35			1							
	1 1				24	3	CIP	Р	360																														
	1 1	16th St.	to	17th St.	12	2	DIP	С	22	18	3	VCP	Р	401	30	2	RCP	С	57						4	2	PCS	Р	11			2	UDG	С					
Thist. to 18th St. 24   3   Cip   P   337   St. 25   St	1 1		$\top$		24	3	CIP	Р	382	18	3	VCP	Р	274												2	CI	Р	315			2	UDG	С	1				
17th St.   10   18th St.   24   3   CIP   C   23   CIP   P   208   18   3   VCP   P   322   15   1   RCP   C   42   C   C   C   C   C   C   C   C   C	1 1		+								<u> </u>	1																							1				
17th St. to   18th St.   24   3   CIP   P   208   18   3   VCP   P   322   15   1   RCP   C   42	1 1		+																			1			1 -							+-	1000	<u> </u>	1				
17th St.   10   18th St.   24   3   CIP   P   208   18   3   VCP   P   322   15   1   RCP   C   42			++		24	3	CIP	+	23	<del>                                     </del>	<u> </u>				$\vdash$					$\vdash$		+					_		30			1	+		+				1
Second Column		1745 64	1	10+6-0+	24	-	CID	- n	200	10	-	1/00	-	222	45	4	Dec		40	$\vdash$		+							25			_	LIBO	_	1				
S		1/tn St.	to	ıstn St.										322	15	1	кСР	C	42	$\vdash$		1				2	PE					2	UDG	С	1	1			-
Second   S			+				_			12	2	VCP	C		$\vdash$					1		1			_				305			1			1				
18th St. to 19th St. 6   1   CIP   C   65   C   C   C   C   C   C   C   C   C			$\perp$				+	+		<u> </u>										$\vdash$					4	2	PE	С				1	1		1				
18th St.   10   19th St.			$\perp \perp$							Ь—		1								$\perp$					$\sqcup$										1				
Second   S			$\perp \perp$		8	1																																	
19th St.   10   20th St.   6   1   CIP   P   342   S   S   S   S   S   S   S   S   S		18th St.	to	19th St.	6	1			65											24	1	BRICK	P	344	4	2	PE	Р	296										
19th St.   10   20th St.   6   1   CIP   P   342   S   S   S   S   S   S   S   S   S			$\Box$		30	3	CIP	Р																															
19th St. to 20th St. 6 1 CIP C 44 12 2 BRICK C			$\top$						342																														
## STAN STAN STAN STAN STAN STAN STAN STAN		19th St.	to	20th St.						12	2	BRICK	C									1			6	2	CI	P	50			2	UDG	С	1		С	25	TWC
Second   S			1.0	25					<del>                                     </del>	•		_		158											<del>1  </del>							+			_				1
## Baltimore Ave. to Main St. 6 1 CIP P 459 24 3 BRICK P 265			+																	$\vdash$		1			_							1	3110	_	_				1
Baltimore Ave. to Main St. 6 1 CIP P 288			+						450						$\vdash$					$\vdash$		1			_							1	-		+				
# 1         1         24         1         BRICK         P         163         2         UDG         C         1         P         197         TV           1	$\vdash$		+ +					_		24	3	BRICK	Ч	265	$\vdash$					+ -		1			_			_				₩	+		+	-		30	<del>                                     </del>
# 1 C 100 TV 1 P 130 TV	1 1	Baltimore Ave	e. to	Main St.	6	1	CIP	P	288	<u> </u>										_					16	3	PE	P	350			_			_	Axon			Multiple
1 P 130 TV	St.		$\perp \perp$				1			<u> </u>										24	1	BRICK	P	163								2	UDG	С	_				
1 P 130 TV	¥		$\perp$							<u> </u>																									1		С	100	TWC
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1 13/ 20 100 104				Total		132					129					17					26					137				26		88			164				

	Types of Pipes
BRICK	Brick Pipe
CI	Cast Iron Pipe
CIP	Cast Iron Pipe
CU	Copper Pipe
DIP	Ductile Iron Pipe
PBS	Protected Bare Steel Pipe
PCCP	Prestressed Concrete Cylinder Pipe
PCS	Protected Coated Steel Pipe
PE	Polyethylene Pipe
PVC	Polyvinyl Chloride Pipe
RCP	Reinforced Concrete Pipe
UNK	Unknown

	Location
С	Crosses street centerline
Р	Parallel to street centerline

## **North End Alternatives**

	(	Cross S	Streets			Wate				Sa	nitary S				S	torm Se				Sanitar	y & Storr	n Sew	er			Gas			Steam/Chi			Electric	:		Co	mmuni	cations	
je j			1			KCM	0	1	_		KCMC	)				KCM	)		_		ксмо				Misso	uri Gas 8	& Energ	g <b>y</b>	Veolia	Energy		KCP&L						
Street	Street	to	Street	Size (in)	Score	Туре	Loc	Length (ft)	Size (in)	Score	Туре	Loc	Length (ft)	Size (in)	Score	Туре	Loc	Length (ft)	Size (in)	Score	Туре	Loc	Length (ft)	Size (in)	Score	Туре	Loc	Length (ft)	Score	Loc	Score	Туре	Loc	Score	Туре	Loc	Length (ft)	Owner
	Delaware St.	to	Main St.	4	1	CIP	Р	342	18	3	VCP	Р	144											24	3	PBS	Р	355	1	Р	1	OHD	Р	1		Р	124	TWC
				8	1	CIP	Р	320	18	3	VCP	Р	186											24	3	PBS	Р	350			1	OHD	С	1		Р	137	TWC
																															<u> </u>			1		С	57	TWC
		_							-										-												<u> </u>			1		P	138	TWC
ندا				_			_		1.0	_			4.55						-						_						-			1		C/P	172	TWC
3rdSt.	Main St.	to	Walnut St.	8	1	CIP	P P	301	18	3	VCP	Р	160											24 24	3	PBS PBS	P P	10 360	1	Р	<u> </u>			1		P	127	TWC
m				8	1	CIP	P	22											1					24	3	PBS	Р	300			<del> </del>			1		C/P	158 146	TWC
																																		1		C	75	TWC
																																		1		P	129	TWC
	Walnut St.	to	Grand Ave.	6	1	CIP	Р	141	18	3	VCP	Р	107											24	3	PBS	Р	160	1	Р	2	UDG	С	1		Р	336	TWC
									18	3	VCP	Р	145											24	3	PBS	Р	105										
	3rd St.	to	4th St.	12	2	CIP	Р	193																6	2	CI	Р	167	1	Р								
				6	1	CIP	Р	202																6	2	PCS	Р	30										
																								12	3	PCS	С	46										
St.																								12	3	PCS	С	3										
l are									_															12	3	PCS	С	70			<u> </u>			<u> </u>				
Delaware	4th St.	to	5th St.	6	1	CIP	Р	333	-										-					6	2	CI	Р	235	1	Р	<u> </u>			1		С	78	TWC
Ĭ				12	2	CIP	Р	550	-										-					6	2	PCS	P	80			-	-		<u> </u>			-	-
	E+b C+	+,	Indopondones Ava	-	1	CID	D.	100	24	2	VCD								-					8	3	PCS	С	40	1	P	-			1			144	TIMC
	5th St. Independence A	-	Independence Ave. 7th St.	6 16	3	CIP	P P	180 666	24	3	VCP	С												6	2	PCS	Р	181	1	P	<del>                                     </del>			1		С	144 356	TWC
	3rd St.	to	1	10	2	CIP	P	201	18	3	VCP	С							72	3	VCP	С							1	Р	<del>                                     </del>			1		С	129	TWC
	314 31.	- 10	5 51151.	10	2	CIP	P	337	10		VCF								12	3	VCF										<u> </u>			1		С	336	TWC
				4	1	CIP	P	7																							<u> </u>			<u> </u>				
	5th St.	to	Missouri Ave.	10	2	CIP	Р	343																16	3	CI	С	42										
				4	1	CIP	Р	317																4	2	CI	Р	62										
Ι.																								24	3	CI	Р	333										
t St.																								24	3	CI	Р	37										
Walnut	Missouri Ave	. to	6th St.	6	1	CIP	С	31	24	3	VCP	С												24	3	CI	Р	100			2	UDG	С	1		С	96	TWC
ž		_		10	2	CIP	P	27	-										_					24	3	CI	P	35			1	OHD	С	<u> </u>			<u> </u>	
		_		10	2	CIP	P	65											-					16	3	PCS	P	2			-			<del> </del>			<u> </u>	-
		_		12 10	2	CIP	P P	466 16	-															16 24	3	PBS PCS	P P	328 2			<u> </u>			<del>                                     </del>			$\vdash$	$\vdash$
		_		10	2	CIP	C	43	+										<del>                                     </del>					24	3	CI	P	40						<del>                                     </del>			<del></del>	
	6th St.	to	7th St.	10	2	CIP	P	24	<del>                                     </del>										<del>                                     </del>					24	3	CI	Р	270			2	UDG	С	<del>                                     </del>				
				10	2	CIP	Р	291																24	3	CI	Р	22										
	3rd St.	to	5th St.	6	1	CIP	Р	216	24	3	VCP	С							72	3	VCP	С		8	3	CI	Р	175	1	Р	2	UDG	С	1		С	336	TWC
				12	2	CIP	Р	409	36	3	VCP	Р	383											12	3	CI	С	8			2	UDG	Р	1		С	362	TWC
٠.				6			Р	299																	3		С	12				OHD				Р	110	TWC
Grand Ave.				12	2	CIP	Р	327																12		CI	С	15			1	OHD	С	1		Р	56	TWC
1 2																									2		Р	159			<u> </u>			<u> </u>				
9.5	5th St.	to	Missouri Ave.			CIP			36	3	VCP	Р	352						-					8			P	330	1	Р		UDG		_		P	20	TWC
		_		12	2	CIP	Р	582	-										-					8	3	CI	Р	8				OHD		1		P	150	TWC
		_							-										-												1	UDG OHD		1		P	133	TWC
<del>-</del>	Walnut St.	to	Grand Ave.	6	1	CIP	P	31	24	2	VCP	C		15	1	RCP	P	154	$\vdash$			-		2	1	DE	Р	169				UDG		1		P P	56 96	TWC
Missouri Ave.	vvairiut St.	- 10	Granu Ave.	6		CIP	_	28	24	3	VCP	C		13	1	NCP	۲	134	1			$\dashv$			1	PE	۲	103				UDG		1		P	144	TWC
Ē			+			CIP		292	1		$\vdash$																				1	_		1		C	50	TWC
SSO					_		<u> </u>																								_	OHD		1		P	131	TWC
Σ																																		1		С	56	TWC
نه	Main St.	to	Walnut St.	20	3	CIP	Р	337																										1		С	373	TWC
7th St.																																						
7																																						

	Types of Pipes								
RICK	Brick Pipe								
	Cast Iron Pipe								
Р	Cast Iron Pipe								
J	Copper Pipe								
IP	Ductile Iron Pipe								
3S	Protected Bare Steel Pipe								
CCP	Prestressed Concrete Cylinder Pipe								
CS	Protected Coated Steel Pipe								
Ē	Polyethylene Pipe								
<b>VC</b>	Polyvinyl Chloride Pipe								
CP	Reinforced Concrete Pipe								
NK	Unknown								

Location
Crosses street centerline
Parallel to street centerline

## **South End Alternatives**

		Cro	ss Str	eets			Wat KCIV			S	nitary Sewer KCMO			9	torm S KCM				Sanita	ry & Sto KCMO		ver		Misso	Gas	& Ener		Steam/Chilled War	er	Electri			Co	ommun	ications	
to			Т				KCIV	1	1					1	KCIVI	<del>-</del>	T			Т				T			5 <b>y</b>	veolia Elleigy		KCFO	<u> </u>	<del>                                     </del>	Т	Т	1	
15.	s	treet	to	Street	Size (in)	Score	Туре	Loc	Length (ft)	Size (in)	Туре Loc	Length (ft)	Size (in)	Score	Туре	Loc	Length (ft)	Size (in)	Score	Туре	Loc	Length (ft)	Size (in)	Score	Туре	Loc	Length (ft)	Score Loc	Score	Туре	Loc	Score	Туре	Loc	Length (ft)	Owner
Г	M	ain St.	to	Grand Ave.	12	2	CIP	Р	191				15	1	RCP	С	43	60	3	BRICK	С	30	150	3	PCS	Р	730		2	UDG	Р					
١Ļ					12	2	CIP	Р	74				15	1	RCP	С	52	15	1	VCP	Р	174							2	UDG	Р					
8					12	2	CIP	Р	201																				2	UDG	С					
1					12	2	CIP	Р	145																				2	UDG	С					
2																													2	UDG	С					
1																													2	UDG	С					
L																													2	UDG	С					

Types of Pipes							
BRICK	Brick Pipe						
CI	Cast Iron Pipe						
CIP	Cast Iron Pipe						
CU	Copper Pipe						
DIP	Ductile Iron Pipe						
PBS	Protected Bare Steel Pipe						
PCCP	Prestressed Concrete Cylinder Pipe						
PCS	Protected Coated Steel Pipe						
PE	Polyethylene Pipe						
PVC	Polyvinyl Chloride Pipe						
RCP	Reinforced Concrete Pipe						
UNK	Unknown						

	Location												
С	Crosses street centerline												
Р	Parallel to street centerline												



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# **Appendix D**



## Cost Methodology for Developing the Opinion of Probable Costs











# Cost Methodology for Developing the Opinion of Probable Cost – Final

Prepared by:

HDR Engineering, Inc.

Prepared for:



Date:

9/16/2011





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### 1 INTRODUCTION

This document provides describes the methodology that will be used to develop capital cost estimates for the Downtown Corridor streetcar and bus alternatives that advance into Tier 2. These estimates will be comparative costs that support Tier 2 screening of alternatives. The estimates will be complete project cost estimates including all major components of the project such as civil construction, utilities, structures, stations, traction power and communications systems, vehicles, fare collection equipment, right-of-way, professional services, and contingencies. All estimates will be based on the assumption that any of the Downtown Corridor alternatives being considered will be designed to similar standards as outlined in the Basis of Design report.

## 1.1 Project Background

The purpose of the Downtown Corridor Alternatives Analysis (AA) is to evaluate alternatives for a transit circulator system connecting Crown Center and Union Station with the Crossroad Arts District, downtown Kansas City, and the River Market area. The study area, which represents the region's most travelled and densely populated, is a two-mile long corridor bounded by River Market at the north end, and Crown Center/Union Station at the south end. The study area is also approximately one-half mile wide, with Main Street/Walnut Street situated closest to the center. The opinion of probable costs that will be developed for the Tier 2 alternatives will be used to compare the alignments and develop an overall project budget. The estimates will be preliminary in nature and include many assumptions outlined in the Basis of Design report and/or this methodology report. As further detail and engineering occur and assumptions are confirmed, the estimates should be updated and may vary from those developed in support of the AA.

## 1.2 Potential Alignments

Several different alignments are being considered in the Tier 1 screening, including alignments that primarily utilize portions of Baltimore Avenue, Main Street, Walnut Street, Grand Boulevard and potentially side streets to transition from one north/south line to another. Because many of the alignment alternatives overlap and may have common elements, they will be broken into segments connected by nodes. A For the purposes of this document, a node is defined as a point at which two or more alignment options "branch". A segment is defined as a stretch of an alignment that connects the nodes. The node-and-segment approach will be used in order to avoid redundant calculations of overlapping portions of the alignment alternatives and provide flexibility in creating additional alternatives by simply adding up the costs for each segment. **Figure 1** is an example cost summary figure that was created for another project. HDR will produce a similar figure for the alignments and alignment options that advance to Tier 2 of the Alternatives Analysis.





SEGMENTE SEGMENT B \$66.4 M 388.9 M SEGMENT D N THE STREET SEGMENT C \$72.5 M \$85,8 M N3) SE AVENU S 90 STREET TACOMA LINK TACCOMA P S 19m STREET 5 19T STREET S 196 STREET SEGMENT A SEGMENT J 5210.7 M

Figure 1 – Example of a Summary Cost Figure by Segment

#### 1.3 Summary of Costs

An opinion of probable cost will be developed for each alignment that is carried past the Tier 1 screening. The costs for each alignment will be developed in current year dollars and then escalated to an assumed year of expenditure of 2015. Once the costs are developed, a summary memo will be prepared including a summary table and the detailed estimates with the breakdown by FTA Standard Cost Category (SCC) categories and individual cost components.

#### 2 COST ESTIMATE METHODOLOGY

The following section outlines the specific approach that will be used to develop the opinion of probable cost estimates for the Downtown Corridor, including a detailed description of the cost categories and items that will be used to build the estimates.

In addition to items related to vehicles, engineering, and construction; the costs include provisions for public agency allowances, including administration, project management, construction management, community relations and involvement, insurance/legal, start up and testing, and training. Because the level of AA design is very conceptual, many of the items in the cost estimates will be represented as allowances. These allowances are based on HDR's experience developing and implementing projects in other cities as well as historical data and the engineer's professional judgment.

The estimates will be developed following the Federal Transit Administration's Standard Cost Categories in order to be easily tracked and audited, and for reporting purposes. A detailed description of the process to be used is described in the following sections.

#### 2.1 Estimate Development

Estimates of project capital costs will be developed in four general steps under this methodology.







- 1. The route and other project components will be broken into segments with common end points (nodes).
- Project cost components, consistent with the level of design, will be identified and quantified for each segment.
- 3. Unit costs will be developed for each of the cost components based on industry standards, HDR's past project experience and other project-specific factors. These cost components will be assembled in a spreadsheet, selective unit costs will be applied, and the quantities will be summed into the major cost categories.
- 4. Additional factors such as contingencies, engineering & administration, and year-of-expenditure escalation will be applied to the summed cost subtotals to complete the cost estimates.

#### 2.2 Format

The estimate will be prepared using Microsoft Excel spreadsheets. The spreadsheet will be organized into three levels. The first level will list the main SCC items and the second level will contain the SCC subcategories. Finally, a third level will expand the sub-categories into units of work to provide a level of detail more appropriate for unit pricing. As necessary, the estimate can roll these levels up into a cost summary using the SCC format for reporting purposes.

#### 2.3 Unit Costs

Unit costs will be developed from selected historical data, including final engineering estimates, completed projects, standard estimating manuals, and standard estimating practices. A mix of historical data from both local roadway/bus and national streetcar projects will be used in developing the appropriate unit costs and allowances to be applied to the cost estimate. In many cases, due to the lack of detailed engineering at this stage in the process, allowances will be established based on the engineer's and firm's experience. This allowance will serve as a "place-holder" until further analysis and design can provide for more accurate and quantifiable units of work.

#### 2.4 Escalation Factor

In order to establish accurate project budgets, an escalation factor must be used. The purpose of an escalation factor is to account for anticipated inflation and increase in the cost of construction, materials and labor over time. The escalation factor is used to take the current year estimate and project it to a future base year or year of expenditure (YoE). For the purpose of this study, the YoE is the year in which the midpoint of construction is anticipated. HDR Engineering will assume 2015 as the year of expenditure for all estimates.

The factor by which the current year estimate will be escalated to the YoE is assumed to be 3.5%. This value was not established using any scientific method or publications and should be reviewed by MARC, KCMO and KCATA for concurrence. It is a reasonable estimate of the possible inflation that could be expected given the constant fluctuation in the economy and cost of material, fuel and labor. The actual inflation or escalation realized over the next several years could be more or less than the assumed value.

## 2.5 Cost Categories





Cost categories consistent with the FTA Standard Cost Categories (SCC) and sub-categories will be used to summarize the unit prices into a comprehensive total estimate for each segment or alternative. The major cost categories are listed and described in greater detail below:

SCC 10: Guideway and Track Elements

SCC 20: Stations, Stops, Terminals, Intermodal

SCC 30: Support Facilities: Yards, Shops, Admin Buildings

SCC 40: Sitework & Special Conditions

SCC 50: Systems

SCC 60: ROW, Land, Existing Improvements

SCC 70: Vehicles

SCC 80: Professional Services

SCC 90: Unallocated Contingency

SCC 100: Finance Charges

Capital costs for the first seven categories (SCC 10-70) will be calculated by using known unit costs and measured quantities for each component. System-wide costs and allowances will be calculated based on route length and not from measured quantities. A per track (or route) -foot unit cost will be developed from historical data to apply to the alignment length. The final three categories (SCC 80-100) will be calculated as a percentage of construction costs (excluding vehicle procurement).

#### 2.5.1 Quantifiable Cost Components (SCC 10-70)

The assumptions included in each cost components quantified in SCC categories 10-70 are detailed in **Table 1** for the streetcar alternatives and **Table 2** for the bus alternatives. All cost items include material, labor and delivery costs for procuring and installing the item. This table is preliminary and will be updated, as necessary, when the estimates are developed.

Table 1 – SCC items 10-70 Key Assumptions: Streetcar Alternatives

Item #	Item Description	Unit	Item Assumptions
10.04.01	Alignment Over Existing Bridge	TF	This item is for any alignment which crosses an existing structure. It assumes the existing structure only requires minor improvements. The item assumes all costs for track, deck improvements and an overlay (~20ft width)
10.10.01	Furnish Rail - Assume 112TRAM Block Rail	TF	This item is for the rail procurement. It assumes 112 TRAM block rail (a domestic replacement for girder rail).



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Item #	Item Description	Unit	Item Assumptions
10.10.02	Embedded Track - Construct Track Slab	TF	This item is for the actual construction and installation of the embedded track. It includes excavation and base rock. All materials and labor are included except for rail counted in item 10.12.01.
10.12.01	Embedded Turnout - Furnish and Install	EA	This item is for any anticipated turnouts to connect the proposed alignments to the existing track or at terminus locations for switching track.
10.12.02	Embedded Crossing - Furnish and Install	EA	This item is for any crossings that may be required to connect the proposed and future track.
20.01.01	Streetcar Stop – Side/center split	EA	This item is for a narrow (8ft) streetcar stop with a simple shelter and next streetcar display. It includes all excavation, construction and furnishing for the stop.
20.01.02	Streetcar Stop – Center Shared	EA	This item is for a center stop which will have the same amenities as the side stop but wider and longer and could have an additional shelter.
30.02.01	Maintenance Facility Building	EA	This item is an allowance for the maintenance facility building and will include all equipment, office space, etc. required to run a streetcar maintenance program
30.05.01	Maintenance Facility Track/Trackwork Allowance	EA	This item is an allowance to cover yard track and non-revenue track to access the facility. It includes any turnouts or special trackwork that may be required. This allowance is based of the facility being designed for 5 streetcar vehicles and being no more than 200 ft from the alignment.
30.05.02	Maintenance Facility Systems allowance (OCS and substation)	EA	This item is an allowance to cover the cost of having a maintenance substation as well as any OCS and stray current protection in the yard.
30.05.03	Maintenance Facility Site Allowance	Acre	This item is an allowance for the civil elements such as pavement, sidewalks, drainage, landscaping, etc.





Item#	Item Description	Unit	Item Assumptions
40.02.01	Utility Relocation - High Allowance (Dense Urban)	TF	This item is an allowance for areas where a significant number of utility relocations are expected due to the density of existing utilities and/or type of corridor. An average of 2 or more conflicts is expected.
40.02.02	Utility Relocation - Medium Allowance (Moderate Density)	TF	This item is an allowance for areas where a moderate number of utility relocations. Impacts may be intermittent with an average of 1 conflict expected.
40.02.03	Utility Relocation - Low Allowance (Minimal Relocation Expected)	TF	This item is an allowance for areas where minimal utility conflicts. It assumes that there is less than 1 conflict and it is intermittent.
40.06.01	Pedestrian Improvement Allowance (Per Intersection)	EA	This item is an allowance for upgrades to the existing sidewalk and pedestrian infrastructure. It includes items such as upgrading ADA ramps to be compliant with current regulations. This allowance is based on the assumption that 3/4 of all existing ramps at an intersection are non-compliant and need to be reconstructed. This results in the assumption that 75% of the ramps for the project will have to be replaced.
40.07.01	Roadway Improvement Allowance	TF	This allowance is intended to cover any additional pavement reconstruction and/or overlay that may be required outside of the track slab. It will be based off experiences and averages from other streetcar projects.
40.07.02	Track Drainage Allowance	TF	This is an allowance for installing track drainage and minor adjustments in the existing storm water system.
40.07.03	Street Lighting Allowance (Adjustments, Relocations, New)	TF	This is an allowance to account for minor conflicts with the existing street lights. Conflicts include direct conflicts or as a result of eliminating access.
40.08.01	Temporary Maintenance of Traffic	LS	This item is to account for the traffic control required during construction. It is taken as a percentage of the direct construction costs.
40.08.02	Contractor Indirect (Staff, Office, etc.)	LS	This item is to account for the contractor indirects during construction including staff, field offices, vehicles, etc.
40.08.03	Art in Transit (1% of Construction)	LS	This item is common to many projects with federal funding. It is common but not necessarily required.





Item #	Item Description	Unit	Item Assumptions
50.01.01	Grand Blvd. Partial Street closure allowance (track/signals)	EA	This item is an allowance to account for 2 cross overs and special wayside controls and controller equipment that will be required for any single track operation that may be required. This would include track and trackwork, two loops, train signals, powered switch controls, etc.
50.02.01	Modify Existing Traffic Signal	EA	This is an allowance for modifying any existing signals along the alignment. Because of the OCS wire, modifications such as shortening the mast arm are common for streetcar projects.
50.02.02	New Traffic Signal Allowance	EA	This is an allowance for a new signal. Detailed analysis is not part of the scope of this study, however, for locations where a new signal is anticipated, this item will be used.
50.02.03	Signal Priority Allowance	TF	This is an allowance to upgrade any of the existing signal equipment along the alignment to allow for signal priority. It is assumed that much of the equipment is in place today and only minor upgrades will be required.
50.02.04	New Pedestrian Traffic Signal Allowance	EA	This is an allowance for a new pedestrian signal. Detailed analysis is not part of the scope of this study, however, for locations where it may make sense to have a pedestrian signal, this item will be used.
50.03.01	Traction Power Substation (Assume 1/Track Mile or 1 per 0.5 Rt. Mile)	EA	This item is to account for the cost to procure and install a traction power substation including any feeder lines to connect between the substation and alignment.
50.04.01	Overhead Trolley Wire Allowance (Poles, wires, appurtenances)	TF	This item is an allowance for the procurement and installation of an OCS system assuming a trolley wire. It includes all costs such as poles, wires, supports, etc.
50.05.01	Communications Allowance?	LS	It is assumed that no major communications system will be installed. However, a modest allowance will be provided to purchase radio equipment, etc.
50.06.01	Fare Collection (On Station or in Vehicle?)	N/A	It is assumed that fare collection will occur on the vehicle, not the station.





Item #	Item Description	Unit	Item Assumptions
60.01.01	Right of Way Acquisition	SF	This is item is to account for any potential ROW acquisition that is anticipated. Additional ROW is not typically required for streetcar projects, however, if there is an instance where it may be needed, the cost will be captured in this item.
70.01.01	Modern Streetcar Vehicle (Assumes wired system)	EA	This item is for one additional vehicle. It is assumed that approximately 1 new vehicle will be required per track mile. In order to distribute the cost of the vehicles equally among the alignment alternatives, vehicles will be prorated at a rate of 1veh/mile.
70.07.01	Spare Parts for New Vehicles (Per Vehicle)	EA	This is an allowance for spare parts for each new vehicle.

Table 2 – SCC items 10-70 Key Assumptions: Bus Alternatives

Item #	Item Description	Unit	Item Assumptions
20.01.01	Bus Stop – Single Direction	EA	This item is for a standard single direction BRT bus stop with a simple shelter and next bus display similar to the existing MAX stops. It includes all excavation, construction and furnishing for the stop.
20.01.02	Bus Stop - Shared	EA	This item is the same as the single direction but wider and longer and possibly with an additional shelter.
20.01.03	Concrete Bus Pad	EA	This item is an allowance for a 12' x 60' concrete bus pad and is assumed at each stop. It includes any minor roadwork in order to remove existing pavement as well as any reconstruction of existing pavement adjacent to the bus pad.
30.02.01	Maintenance Facility Building/site expansion	EA	This item is an allowance for any expansion or additions to the existing bus maintenance facility/site that may be needed to serve the additional bus fleet.

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Cost Methodology





Item#	Item Description	Unit	Item Assumptions
40.06.01	Pedestrian Improvement Allowance (Per Intersection)	EA	This item is an allowance for upgrades to the existing sidewalk and pedestrian infrastructure. It includes items such as upgrading ADA ramps to be compliant with current regulations. This allowance is based on the assumption that 3/4 of all existing ramps at an intersection are non-compliant and need to be reconstructed.
40.06.02	Streetscape allowance	EA	This item is an allowance for minor streetscape improvements in and around the stop locations.
40.07.01	Roadway Improvement Allowance	RF	This allowance is intended to cover improvements to the existing roadway such as any potential overlays, pavement replacement that may be required, modifications to the existing curb lines or additions of traffic medians etc. It is allowance to provide a budget for these types of improvements and based on similar types of projects.
40.07.02	Drainage Allowance	RF	This is an allowance for minor adjustments in the existing storm water system due to any changes in drainage patterns for the bus stops, etc.
40.08.01	Temporary Maintenance of Traffic	LS	This item is to account for the traffic control required during construction. It is taken as a percentage of the direct construction costs.
40.08.02	Contractor Indirect (Staff, Office, etc.)	LS	This item is to account for the contractor indirects during construction including staff, field offices, vehicles, etc.
40.08.03	Art in Transit (1% of Construction)	LS	This item is common to all projects with federal funding.
50.02.01	Modify Existing Traffic Signal for Transit Signal and Queue Jump	EA	This is an allowance to upgrade any of the existing signal equipment and add a transit signal head to an existing signal where a queue jump is added.
50.02.02	New Pedestrian Traffic Signal Allowance	EA	This is an allowance for a new pedestrian signal. Detailed analysis is not part of the scope of this study, however, for locations where it may make sense to have a pedestrian signal, this item will be used.





Item#	Item Description	Unit	Item Assumptions	
50.02.03	Signal Priority Allowance	TF	This is an allowance to upgrade any of the existing signal equipment along the alignment to allow for signal priority. It is assumed that much of the equipment is in place today and only minor upgrades will be required.	
50.02.04	New Traffic Signal	EA	This is an allowance for a new signal. Detailed analysis not part of the scope of this study, however, for locations where a new signal is anticipated, this item will be used.	
50.06.01	Fare Collection	EA	This is an allowance to install a TVM at each stop.	
60.01.01	Right of Way Acquisition	SF	This is item is to account for any potential ROW acquisition that is anticipated. Additional ROW is not typically required for arterial BRT projects; however, if there is an instance where it may be needed, the cost will be captured in this item.	
70.04.01	Modern BRT Vehicle	EA	This item is for one additional vehicle. It is assumed that approximately 1 new vehicle will be required per alignment mile. In order to distribute the cost of the vehicles equally among the alignment alternatives, vehicles will be prorated at a rate of 1veh/mile.	
70.07.01	Spare Parts for New Vehicles (Per Vehicle)	EA	This is an allowance for spare parts for each new vehicle.	

#### 2.5.2 Allocated Contingencies (SCC 10-70)

Contingency is typically included in an estimate to address uncertainties based on the current level of engineering design. The contingency allowance addresses the potential for quantity fluctuations and cost variability when items of work are not readily apparent or unknown at the current level of design. Contingency is assigned in two major categories, allocated and unallocated. Unallocated contingencies are covered by SCC 90. Allocated contingencies are line-item contingencies applied to each item in SCC 10 through SCC 70.

Based on the extremely limited level of design development of the AA, an allocated contingency of 15-30 percent will be used and applied to the items in cost categories 10-70. The percentage selected will be based on professional experience and judgment related to the potential variability of costs within each of these cost categories.

#### 2.5.3 Professional Services (SCC 80)

This category includes the costs for engineering, administration and construction management services. Costs for these services will be based on a percentage of the total cost of all direct capital cost





categories except vehicles and right-of-way. The percentages will be applied individually and not cumulatively. The following percentages will be used for this estimate:

Professional Services Percentages For Estimates					
Description	Percentage				
80.01 - Preliminary Engineering	2.5				
80.02 - Final Design	7				
80.03 - Project Management for Design and Construction	5				
80.04 - Construction Administration and Management	6				
80.05 - Insurance	3				
80.06 - Legal; Permits; Review Fees	2				
80.07 - Survey, Testing, Investigation, Inspection	2				
80.08 - Start-up Costs	2				
Tota	al <b>29</b> .5%				

#### 2.5.4 Unallocated Contingency (SCC 90)

Both allocated and unallocated contingency are typically used to estimate early opinions of probable costs. Unallocated contingencies are intended to cover the unknowns not yet identified, quantifiable or known at a given stage of project development. Typically the unallocated contingency at the early conceptual engineering stage would be 25% of project costs.

#### 2.5.5 Finance Charges (SCC 100)

This category includes finance charges expected to be incurred to complete the project. Costs are derived from the New Start's financial plan. At this stage, Finance Charges are not assumed or included in the estimate.

#### 3 CONCLUSION AND LIMITATIONS

The opinion of probable costs that will be developed as part of the Alternatives Analysis are conceptual in nature and based on limited engineering data. HDR will complete a high-level engineering screening and will document system assumptions (Basis of Design Report) and this cost methodology to support the estimates that will be produced.

The main purpose of these estimates are for comparative purposes and to establish an order of magnitude budget as the project moves forward into a more detailed design phase. As more detailed design and analysis occur during ACE (advanced conceptual engineering) and PE (preliminary engineering), the estimates produced should be reviewed and refined. The actual project costs estimated as part of the AA with limited engineering and investigation may be higher or lower than actual costs and is to only serve as establishing an order of magnitude budget and to compare alternatives.

MARC, KCMO and KCATA have all reviewed draft versions of this document. All comments and issues have been resolved and this methodology is considered final and will serve as the basis of the opinion of probable cost estimates along with the final basis of design report.

Cost Methodology



HIR

# **Appendix E**



### KCMO Downtown Circulator AA – Opinion of Probable Cost Summary











#### Technical Memorandum

Date September 16, 2011

Re: KCMO Downtown Circulator AA – Opinion of Probable Costs Summary

To: Partnership Team

The project team has developed the final project costs for the streetcar and bus alternatives on Main Street and Grand Boulevard. These estimates should be considered order of magnitude and used for comparative purposes only and/or establishing a conceptual baseline project budget. The estimates are based on a conceptual level of engineering and technical evaluation of the potential alignments. This memo is intended to provide a brief overview of the estimating methodology, breakdown of the project costs and summary of the initial opinion of probable costs for the projects. Key design assumptions and conceptual alignment drawings have been developed and provide more detailed information.

#### **Estimate Development Methodology**

The project cost estimates were primarily developed using historic streetcar project costs on similar type projects and adjusted, as necessary to be relative to the bidding market in Kansas City versus the source project (primarily Portland, the most recent streetcar project constructed). The estimates include quantifiable items with unit costs as well as allowances for anticipated items that do not have sufficient detail to quantify at this time. For more information on the cost methodology and approach, please refer to the Final Cost Methodology Report.

#### **Cost Categories and Breakdown**

The estimates include all projects costs including construction, right of way, vehicles, professional services (soft costs), allocated and unallocated contingencies and inflation. Combined, these project costs make up the total project cost as viewed by FTA and are established using the FTA Standard Cost Categories (SCC) workbook. The Standard Cost Categories are separated into 10 major categories 10, 20, 30... through 100. The following is a brief summary of the cost components (SCC sections) and description of what is included.

**Construction** (SCC 10-50) – The construction cost of the project, which includes SCC sections 10 through 50, includes all capital improvement costs for the streetcar project. This includes all track, civil, stations, maintenance and administration buildings, systems and contractor indirects.

This section includes line item contingencies (allocated) typically ranging from 20-30% to account for uncertainty in quantity and/or price for that particular item.

**Right of Way (SCC 60)** – This cost component includes the anticipated right of way costs for the project. For a streetcar, the right of way costs are typically limited to the maintenance facility, substations, and an occasional encroachment for a streetcar stop or making 90-degree turns. At this stage of project development, the right of way costs assumed are an allowance. The allowance is primarily based off the maintenance facility siting report's average appraised value of potential sites with some additional allowance included for substations and minor encroachments.

**Vehicles** (**SCC 70**) – This cost component includes the costs for procuring modern streetcar vehicles and spare parts. The cost is based off recent pricing and the most recent streetcar vehicle procurement in Atlanta with a vehicle cost of about \$4.3 million per vehicle. This assumes a federally funded project where vehicles must meet Buy America requirements. Small orders such as the 4 anticipated to be needed for this project, drive up the per unit cost over larger orders typical of larger light rail systems.

**Professional Services (SCC 80)** – This category includes all professional, technical and management services related to the design and construction of fixed infrastructure (SCC 10 - 50) during the preliminary engineering, final design, and construction phases of the project. This includes environmental work, design, engineering and architectural services; specialty services such as safety or security analyses; value engineering, risk assessment, cost estimating, scheduling, Before and After studies, ridership modeling and analyses, auditing, legal services, administration and management, etc. by agency staff or outside consultants. As a percentage of construction costs (SCC 10-50) professional services typically fall anywhere from 20-40% with the national average (based on a recent TRB study of 59 completed projects) of 30%. The assumed soft costs for the streetcar estimates are 29.5% of construction costs (SCC 10-50).

**Unallocated Contingency (SCC 90)** – This category is a contingency (overall percentage) applied to the entire project and intended to serve as a project reserve for unanticipated costs incurred during project design and/or construction. This contingency is in addition to the line item (allocated) contingency that is applied individually to each line item in categories 10-80.

**Inflation** – Inflation is a key component to account for when developing the costs and establishing a project budget. The estimates were developed in "today's" dollars (3<sup>rd</sup> Q. 2011) and escalated to the year of expenditure based on mid-year of construction/design. An escalation

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factor of 3.5% was used and mid-year of construction was assumed to be 2014. The detailed estimates attached to this document included a column for both "today's" dollars as well as the estimate in the year of expenditure (YoE).

#### **Opinion of Probable Cost Summary**

Based on the approach and breakdown described above, HDR developed an opinion of probable costs for both the Main Street and Grand Boulevard Streetcar and Bus alternatives. The total project cost in year of expenditure is estimated at \$101 million for the Main Street Streetcar alternative with a 4.1 track mile alignment. The Grand Boulevard alternative is estimated at \$102 million for a 3.7 track mile alignment. Bus alternatives for Main Street and Grand Boulevard alignments are \$20 million and \$18 million respectively. A summary of the project costs by major categories described previously is shown in Tables 1 and 2. Detailed estimate for both Main and Grand Alternatives are also attached. For detailed assumptions, methodology, etc, the reader is encouraged to refer to the final versions of the Basis of Design, Cost Methodology, Utility memo and Maintenance Facility reports available on the project SharePoint site.

Table 1 – Summary of the Main Street and Grand Boulevard Streetcar Alternative Costs.

	Main	Main Street		oulevard
Cost Category	Cost	% of Total	Cost	% of Total
Construction (SCC 10-50)	\$53.5 M	53.0%	\$54.4 M	53.2%
Right of Way (SCC 60)	\$2.7 M	2.7%	\$2.7 M	2.7%
Vehicles (SCC 70)	\$19.0 M	18.8%	\$19.0 M	18.6%
Professional Services (SCC 80)	\$16.6 M	16.5%	\$16.9 M	16.5%
Unallocated Contingency (SCC 90)	\$9.2 M	9.1%	\$9.3 M	9.1%
Total Project Cost	\$101.0 M		\$102.3 M	
Total Length (Track Miles)	4.1		3.7	
Cost per Track Mile	\$24.6 M		\$27.6 M	

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Table 2 – Summary of the Main Street and Grand Boulevard Bus Alternative Costs.

	Main	Main Street		oulevard
Cost Category	Cost	% of Total	Cost	% of Total
Construction (SCC 10-50)	\$11.7 M	57.4%	\$9.8 M	55.5%
Right of Way (SCC 60)	\$0 M	0%	\$0 M	0%
Vehicles (SCC 70)	\$3.2 M	15.8%	\$3.2 M	18.2%
Professional Services (SCC 80)	\$3.6 M	17.8%	\$3.0 M	17.2%
Unallocated Contingency (SCC 90)	\$1.8 M	9.1%	\$1.6 M	9.1%
Total Project Cost	\$20.4 M		\$17.7 M	
Total Length (Trip Miles)	4.8		4.4	
Cost per Track Mile	\$4.3 M		\$4.0 M	

Sincerely,

#### HDR Engineering, Inc.

Luke Olson, PE Engineering Task Lead

Attachments: Please find the detailed Cost estimates attached

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L	2	Main: Streetcar M1-M8	-IMI-M8							Current Year		Inflation Rate
	4	4.1 Track Mile:	4.1 Track Miles Approximately \$25 Million Per Track Mile	1						2011.75 (YR)		3.50%
ccc	SCC Sub Item #	Item#	Item Discription	Unit	Unit Cost	Quantity	Item Cost	A. Cont.	Item Cont.	Subtotal	YoE	Subtotal YoE
10			GUIDEWAY & TRACK ELEMENTS (route miles)				\$9,891,650		\$1,488,465	\$11,380,115		\$12,295,960
	10.04		Guideway: Aerial structure				\$1,565,500		\$469,650	\$2,035,150		\$2,198,934
		10.04.01	Alignment Over Existing Bridge	1TF	\$200	3131.0	\$1,565,500	30%	\$469,650	\$2,035,150	2014	\$2,198,934
	10.10		Track: Embedded				\$7,976,150		\$948,815	\$8,924,965		\$9,643,225
		10.10.01	Furnish Rail - Assume 112TRAM Block Rail	±L.	02\$	21600.0	\$1,512,000	70%	\$302,400	\$1,814,400	2014	\$1,960,419
		10.10.02	Embedded Track - Construct Track Slab	¥	\$350	18469.0	\$6,464,150	10%	\$646,415	\$7,110,565	2014	\$7,682,807
	10.12		Track: Special (switches, turnouts)				\$350,000		\$70,000	\$420,000		\$453,801
		10.12.01	Embedded Turnout - Furnish and Install	EA	\$175,000	2.0	\$350,000	70%	\$70,000	\$420,000	2014	\$453,801
		10.12.02	Embedded Crossing - Furnish and Install	EA	\$120,000	0.0	\$0	20%	0\$	0\$	2014	\$0
20			STATIONS, STOPS, TERMINALS, INTERMODAL (number)				\$2,480,000		\$496,000	\$2,976,000		\$3,215,501
	20.01		At-grade station, stop, shelter, mall, terminal, platform				\$2,480,000		\$496,000	\$2,976,000		\$3,215,501
		20.01.01	Streetcar Stop - side/center split	EA	\$120,000	18.0	\$2,160,000	70%	\$432,000	\$2,592,000	2014	\$2,800,598
		20.01.02	Streetcar Stop - Center shared	EA	\$160,000	2.0	\$320,000	20%	\$64,000	\$384,000	2014	\$414,903
	20.02		Aerial station, stop, shelter, mall, terminal, platform				\$0		\$0	0\$		\$0
30			SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS				\$6,920,000		\$1,384,000	\$8,304,000		\$8,972,286
	30.02		Light Maintenance Facility				\$4,000,000		\$800,000	\$4,800,000		\$5,186,293
		30.02.01	Maintenance Facility Building including office space	SI	\$4,000,000	1.0	\$4,000,000	70%	\$800,000	\$4,800,000	2014	\$5,186,293
	30.05		Yard and Yard Track				\$2,920,000		\$584,000	\$3,504,000		\$3,785,994
		30.05.01	Maintenance Facility Track/Trackwork Allowance	ST	\$1,600,000	1.0	\$1,600,000	70%	\$320,000	\$1,920,000	2014	\$2,074,517
		30.05.02	Maintenance Facility Systems allowance (OCS and substation)	SI	\$1,000,000	1.0	\$1,000,000	20%	\$200,000	\$1,200,000	2014	\$1,296,573
		30.05.03	Maintenance Facility Site Allowance	SI	\$320,000	1.0	\$320,000	20%	\$64,000	\$384,000	2014	\$414,903
40			SITEWORK & SPECIAL CONDITIONS				\$11,501,954		\$1,771,239	\$13,273,193		\$14,181,893
	40.02		Site Utilities, Utility Relocation				\$3,357,850		\$1,007,355	\$4,365,205		\$4,557,011
		40.02.01	Utility Relocation - High Allowance (3+ or significant relocations)	TF	\$200	1250.0	\$625,000	30%	\$187,500	\$812,500	2013	\$848,201
		40.02.02	Utility Relocation - Medium Allowance (1-2 relocations)	±	\$300	1000.0	\$300,000	30%	\$90,000	\$390,000	2013	\$407,137
		40.02.03	Utility Relocation - Low Allowance (1 or less (avg) relocations)	ΤF	\$150	16219.0	\$2,432,850	30%	\$729,855	\$3,162,705	2013	\$3,301,673
	40.06		Pedestrian / bike access and accommodation, landscaping				\$330,000		\$99,000	\$429,000		\$463,525
		40.06.01	Pedestrian Improvement Allowance (Per Intersection)	EA	\$15,000	22.0	\$330,000	30%	\$99,000	\$429,000	2014	\$463,525
	40.07		Automobile, bus, van accessways including roads, parking lots				\$2,400,970		\$664,884	\$3,065,854		\$3,312,587
		40.07.01	Roadway Improvement Allowance	TF	\$100	18469.0	\$1,846,900	30%	\$554,070	\$2,400,970	2014	\$2,594,194
		40.07.02	Track Drainage Allowance	¥	\$20	18469.0	\$369,380	20%	\$73,876	\$443,256	2014	\$478,928
		40.07.03	Street Lighting Allowance (Adjustments, Relocations, New)	TF	\$10	18469.0	\$184,690	20%	\$36,938	\$221,628	2014	\$239,464
	40.08		Temporary Facilities and other indirect costs during construction				\$5,413,134		0\$	\$5,413,134		\$5,848,770
		40.08.01	Temporary Maintenance of Traffic	ST	2%	33832087.2	\$1,691,604	%0	0\$	\$1,691,604	2014	\$1,827,741
		40.08.02	Contractor Indirects (Staff, Office, etc.)	SI	10%	33832087.2	\$3,383,209	%0	0\$	\$3,383,209	2014	\$3,655,481
		40.08.03		SI	1%	33832087.2	\$338,321	%0	0\$	\$338,321	2014	\$365,548

2 of 4

State   Stat												\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
10.01.01   Colore Birth Spring Residency Colores (Brack-Signales)   14   5.2000, total Colores (Brack-Signales)   15   5.2000, total Colores (Brack-Signales)			SYSTEIMS				000,686,114		2004-117-6	913,/03,000		0-6-106
10.01.021   Control Method printing Triangle and constraint printing Systal Method Printi	50.03		I rain control and signals						0\$	90		\$
10.00.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0		50.01.01		EA	\$2,000,000			20%	\$0	\$0		\$
State	50.05		Traffic signals and crossing protection				\$2,357,000		\$471,400	\$2,828,400		\$3,056,023
SCIOLOGY   New Principle Signal Monogeneral State		50.02.01	Modify Existing Traffic Signal	ΕA	\$75,000	17.	\$1.275,000	20%	\$255,000	\$1.530,000	2014	\$1.653.13
Statistical Signature   Statistical Stat		50.02.02	New Traffic Signal Allowance	ΡĀ	\$175,000	ř	\$525,000	20%	\$105,000	\$630,000	2014	\$680.70
20.00.01   Interface feature in the control of th		20:02	Oland Drivity Allowand	j	000/01=4	l		2000	\$65,000	¢510 400	201	¢5500,000
10.00.00   10.00.00		30.02.03	Olginal Filolity Allowalice	- (	320		İ	20%	300,400	3310,400	i	3300,120
Tracitor Poure Supplication (Assume 17 Page 18 Page			INEW Pedestrian Traffic Signal Allowance	EA	\$172,000		ľ	%N7	355,000	OUU,UCT \$		162U/1.64/
50.04.01   Treation Power distribution: Calemany and fair fail for 1 per 0.5 Ft Mile)   EA   \$500,000   \$582,200   \$582,200   \$582,200   \$582,200   \$584,320   \$584,320   \$584,320   \$584,320   \$586,432,00   \$586	50.03	3	Traction power supply: substations				\$3,600,000		\$720,000	\$4,320,000		\$4,667,663
90 Odd         Threston power and state of the stat		50.03.01	Mile or 1 per	EA	\$900,000			70%	\$720,000	\$4,320,000		\$4,667,663
Stock of the Communications Allowarton (Potles, wires, appurhenances)   Title   Stock of the Communications Allowarton (Potles, wires, appurhenances)   Title   Stock of the Communications Allowarton (Potles, wires, appurhenances)   Title   Stock of the Communications Allowarton (Potles, wires, appurhenances)   Title   Stock of the Communications Allowarton (Potles, wires, appurhenances)   Title   Stock of the Communications Allowarton (Potles, wires, appurhenances)   Title   Stock of the Communications Allowarton (Potles, wires, appurhenances)   Title   Stock of the Communication (Potles)   Title   Stock of the Com	50.04	1	Traction power distribution: catenary and third rail						\$583,200	\$6,415,200		\$6,931,480
9.00.56         Communications         \$500.000         Sp. 500.000         <			Overhead Trolley Wire Allowance (Poles, wires, appurtenances)	TF	\$270		\$5,832,000	10%	\$583,200	\$6,415,200		\$6,931,480
50.06   Communications Altowarded   E   \$200,000   L9   \$200,000   DM   SQ0,001   SQ0,000   SQ	50.05		Comminications				\$200 000		U\$	\$200,000		\$216.096
State   Contraction Contract	0.00		Commission Allowana	0	\$200,000			700	O\$	\$200,000	2014	\$216,000
Solution   State   Solution   State   Solution   Solu			COLITICATIONS Allowance	3	3200,000		2200,0	0/0	O¢ ,	3200,000	50T4	52,010
SOURCIN   Participation (none assume on variety)   EA   SO   O   \$42,235.50   O   \$1,500.00   \$1,500	50.06		Fare collection system and equipment						\$0	\$0		\$
Construction Subride the SNATH MEMBROWERENTS   Construction Subride SNATH MEMBROWERENTS   Construction Subride SNATH MEMBROWERENTS   Construction Subride SNATH MEMBROWERENTS   Construction SNATH MEMBROWERENTS   Construction SNATH MEMBROWERENTS   Construction SNATH MEMBROWERENTS   Construction SNATH MEMBROWERENTS   Construction SNATH MEMBROWERENTS   Construction Membrowerent SNATH MEMBROWERENTS   Construction		50.06.01	Fare Collection (none - assume on vehicle)	EA	0\$			%0	0\$	0\$		)\$
Column   C	Const	truction Sub	total (10-50)			0.0	\$42,782,604		\$6,914,304	\$49,696,908		\$53,536,903
Column   Purchase of real estate   Column   Co			ROW, LAND, EXISTING IMPROVEMENTS				\$2,000,000		\$600,000	\$2,600,000		\$2,714,243
Particular   Right of Way Acquisition   Light Rail   S4,200,000   216,500,000   235,000   2335,000   217,135,000   234,000   235,000   237,000	60.01	1	Purchase or lease of real estate				\$2,000,000		\$600,000	\$2,600,000		\$2,714,243
ValidEt Strumber   ValidEt Str		г	Right of Way Acquisition	SI	\$2,000,000			30%	\$600,000	\$2,600,000	2013	\$2,714,243
To 0.1   Light Rail   Modern Streetcar Vehicle (Assumes wired system)   FA   \$42,000,000   2%6,800.000   2%0,000   242	g		VEHICLES (number)				Ş		\$356,000	\$17,556,000		\$18,968,860
70.01.01   Modern Streetcar Vehicle (Assumes wired system)   EA   \$4.200.000   25,600.000   \$17,136,000   \$17,136,000   \$20.	70.01		Light Rail				\$16,800,000		\$336,000	\$17,136,000		\$18,515,065
7.007   200.000   240.00		г	Modern Streetcar Vehicle (Assumes wired system)	ΕΔ	\$4 200 000		\$16 800 000	%C	\$336,000	\$17,136,000	2014	\$18 515 06
1007.01   Spate Parts for New Vehicles (Per Vehicle)   EA   \$100,000   4.0   \$200,000   5%   \$20,000   \$420,000   \$243,	70 07	7	Spare parts	5	0000001		\$400,000	0/3	\$20,000	\$420,000	1107	\$453.80
200.00   Property and Propert	5		Oracio para for Nous Vehicles	<	\$100,000			10/	000 000	000,021.4	2014	CAE2 00.
Solid		10.07.01	Spare Parts for New Venicies (Per Venicie)	EA	\$100,000			9%6	\$20,000	\$420,000	2014	,5453,8U
80.01   Percentage of Direct Costs SCC (10-50)   LS   2.5%   53536902.8   51,338,423   So   52,676,845   So   52,676,8			PROFESSIONAL SERVICES (applies to Cats. 10-50)				\$15,793,386		80	\$15,793,386		\$16,637,076
80.02   Percentage of Direct Costs SCC (10-50)   LS   2.5%   53336902.8   51,38.4.43   0%   5.0   51,338.4.43   2012   200.02   Percentage of Direct Costs SCC (10-50)   LS   7.0%   53536902.8   53,747,583   0%   5.07,747,583   5.0   53,747,583   2013   2013   20.0.02   Percentage of Direct Costs SCC (10-50)   LS   5.0%   53536902.8   52,676,845   0%   5.0   5.2676,845   2013	80.01		Preliminary Engineering				\$1,338,423		\$0	\$1,338,423		\$1,349,983
State   Stat		80.01.01	Percentage of Direct Costs SCC (10-50)	rs	2.5%		\$1,338,423	%0	0\$	\$1,338,423	2012	\$1,349,983
80.02.01         Percentage of Direct Costs SCC (10-50)         LS         7.0%         535.36902.8         \$3,747,583         0.0%         \$3,747,583         20.13           80.03.01         Percentage of Direct Costs SCC (10-50)         LS         5.0%         53536902.8         \$3,747,583         0.0%         \$3,747,583         20.13           80.03.01         Percentage of Direct Costs SCC (10-50)         LS         5.0%         53536902.8         \$3,212,214         0.0%         \$3,212,214         20.14           80.04.01         Percentage of Direct Costs SCC (10-50)         LS         6.0%         53536902.8         \$3,212,214         0.0%         \$3,212,214         20.14           80.05         Professional Liability and other Non-Construction Insurance         LS         6.0%         53536902.8         \$1,606,107         0.%         \$3,212,214         20.14           80.05.01         Percentage of Direct Costs SCC (10-50)         LS         3.0         \$3,512,214         0.0%         \$3,100,738         0.04         \$3,100,738         0.04         \$3,100,738         0.04         \$3,100,738         0.04         \$3,100,738         0.04         \$3,100,738         0.04         \$3,100,738         0.04         \$3,100,738         0.04         \$3,100,738         0.04         \$3,100,738	80.05	2	Final Design				\$3,747,583		0\$	\$3,747,583		\$3,912,25
80.03         Project Management for Design and Construction         Project Management for Design and Construction         \$2,676,845         \$0         \$2,676,845         2013           80.03.01         Percentage of Direct Costs SCC (10-50)         LS         5.0%         532,676,845         0%         \$2,676,845         2013           80.04         Portecting of Direct Costs SCC (10-50)         LS         6.0%         532,650,28         \$3,121,214         0%         \$3,212,214         2014           80.05         Professional Liability and other Non-Construction Insurance         LS         6.0%         53535902.8         \$3,100,173         \$0.05         \$1,606,107         \$0.05         \$1,606,107         \$0.05         \$1,606,107         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$0.05         \$1,007,738         \$1,007,738         \$0.05         \$1,007,738         \$1,007,738         \$0.05		80.02.01	Percentage of Direct Costs SCC (10-50)	ST	7.0%		\$3,747,583	%0	0\$	\$3,747,583	2013	\$3,912,25
80.03.01   Percentage of Direct Costs SCC (10-50)   LS   5.0%   53536902.8   52,676,845   0%   5.013   22,676,845   2013   22,676,845   2013   22,676,845   2013   22,676,845   2013   22,676,845   2013   22,676,845   2013   22,676,845   2	80.03	3	Project Management for Design and Construction				\$2,676,845		0\$	\$2,676,845		\$2,794,465
80.04         Construction Administration & Management         Image: Book of the Construction Administration & Management         ES.212,214         So. \$3,212,214         So. \$3,212,214         2014           80.04.01         Percentage of Direct Costs SCC (10-50)         LS         6.0%         53536902.8         \$3,122,214         0%         \$1,666,107         \$0.04         \$1,666,107         \$0.04         \$1,666,107         \$0.04         \$1,666,107         \$0.04         \$1,666,107         \$0.04         \$1,666,107         \$0.04         \$1,666,107         \$0.04         \$1,666,107         \$0.04         \$1,666,107         \$0.04         \$0.04         \$1,666,107         \$0.04         \$1,666,107         \$0.04         \$1,666,107         \$0.04         \$1,606,107         \$0.04         \$1,606,107         \$0.04         \$1,606,107         \$0.04         \$1,007,738         \$0.04         \$1,007,738         \$0.04         \$1,007,738         \$0.04         \$1,007,738         \$0.04         \$1,007,738         \$0.04         \$1,007,738         \$0.04         \$1,007,738         \$1,007,738         \$0.04         \$1,007,738         \$0.04         \$1,007,738         \$0.04         \$1,007,738         \$1,007,738         \$1,007,738         \$1,007,738         \$1,007,738         \$1,007,738         \$1,007,738         \$1,007,738         \$1,007,738         \$1,0		80.03.01	Percentage of Direct Costs SCC (10-50)	ST	2.0%		\$2,676,845	%0	0\$	\$2,676,845	2013	\$2,794,465
80.04.01   Percentage of Direct Costs SCC (10-50)   LS   6.0%   53536902.8   53,212,214   0%   50   53,212,214   2014   2014   80.05.01   Percentage of Direct Costs SCC (10-50)   LS   3.0%   53536902.8   51,606,107   0%   50   51,606,107   2013   80.06.01   Percentage of Direct Costs SCC (10-50)   LS   2.0%   53536902.8   51,070,738   51,0	80.04		Construction Administration & Management				\$3,212,214		0\$	\$3,212,214		\$3,470,726
80.05         Professional Liability and other Non-Construction Insurance         \$1,606,107         \$0         \$1,606,107         \$0         \$1,606,107         \$0         \$1,606,107         \$0         \$1,606,107         \$0         \$1,606,107         \$0         \$1,606,107         \$0         \$1,606,107         \$0         \$1,007,738         \$0.013         \$0         \$1,007,738 <t< td=""><td></td><td>80.04.01</td><td>Percentage of Direct Costs SCC (10-50)</td><td>ST</td><td>90.9</td><td></td><td>\$3,212,214</td><td>%0</td><td>0\$</td><td>\$3,212,214</td><td>2014</td><td>\$3,470,726</td></t<>		80.04.01	Percentage of Direct Costs SCC (10-50)	ST	90.9		\$3,212,214	%0	0\$	\$3,212,214	2014	\$3,470,726
80.05.01   Percentage of Direct Costs SCC (10-50)   LS   3.0%   53536902.8   \$1,606,107   0%   \$6   \$1,606,107   2013   80.06	80.05	2					\$1,606,107		0\$	\$1,606,107		\$1,676,679
80.06   Legal; Permits; Review Fees by other agencies, cities, etc.   \$1,070,738   \$6 \$1,070,738   \$1,070,7		80.05.01		SI	3.0%		\$1,606,107	%0	0\$	\$1,606,107	2013	\$1,676,679
80.06.01   Percentage of Direct Costs SCC (10-50)   LS   2.0%   53536902.8   \$1,070,738   0%   \$6   \$1,070,738   2013   80.07	80.06		s, cities,				\$1,070,738		0\$	\$1,070,738		\$1,117,786
80.07         Surveys, Testing, Investigation, Inspection         \$1,070,738         \$0         \$1,070,738         \$1,070,738         \$1,070,738         \$1,070,738         \$1,070,738         \$1,070,738         \$1,070,738         \$1,070,738         \$1,070,738         \$1,070,738         \$1,070,738 <th< td=""><td></td><td></td><td></td><td>SI</td><td>2.0%</td><td>ı</td><td>\$1,070,738</td><td>%0</td><td>0\$</td><td>\$1,070,738</td><td>2013</td><td>\$1,117,786</td></th<>				SI	2.0%	ı	\$1,070,738	%0	0\$	\$1,070,738	2013	\$1,117,786
80.07.01   Percentage of Direct Costs SCC (10-50)   LS   2.0%   53536902.8   \$1,070,738   0%   \$50   \$1,070,738   2013   80.08   80.08   Start up   Soc (10-50)   LS   2.0%   53536902.8   \$1,070,738   \$0.08.01   Start up   Soc (10-50)   LS   2.0%   53536902.8   \$1,070,738   \$0.08.01   \$1,070,738   \$0.15   \$1,070,738   \$1,070,738   \$1,070,730   \$1,070,738   \$1,070,730   \$1,070,738   \$1,070,730   \$1,070,738   \$1,070,730   \$1,070,738   \$1,070,730   \$1,	80.07	1.	Surveys, Testing, Investigation, Inspection				\$1,070,738		0\$	\$1,070,738		\$1,117,786
80.08         Start up         \$1,070,738         \$0         \$1,070,738         \$0         \$1,070,738         \$0         \$1,070,738         \$10,070,738         \$10,070,738         \$10,070,738         \$20,		80.07.01	Percentage of Direct Costs SCC (10-50)	SI	2.0%		\$1,070,738	%0	0\$	\$1,070,738	2013	\$1,117,786
80.08.01   Percentage of Direct Costs SCC (10-50)   LS   2.0%   53536902.8   \$1,070,738   0%   \$0   \$1,070,738   2015	80.08	3	Start up				\$1,070,738		0\$	\$1,070,738		\$1,197,400
Subtotal (10-80)         \$77,775,990         \$7,870,304         \$85,646,294         \$           UNALLOCATED CONTINGENCY         LS         10%         \$8,564,629         \$8,564,629		80.08.01	Percentage of Direct Costs SCC (10-50)	SI	2.0%	ı	\$1,070,738	%0	0\$	\$1,070,738	2015	\$1,197,400
UNALLOCATED CONTINGENCY         LS         10%         \$8,564,629           FINANCE CHARGES         Current Year Total	Subto	tal (10-80)	-				\$77,775,990		\$7,870,304	\$85,646,294		\$91,857,088
FINANCE CHARGES	0		UNALLOCATED CONTINGENCY	ST	10%					\$8,564,629		\$9,185,70
	0		FINANCE CHARGES						Cul	<b>Current Year Total</b>		YoE Total

		Grand Blv	Grand Blvd Sheets 17-23							Current Year		Inflation Rate
کارز	dus 228	SCC Sub Item #	Approximately 227 million refugice man Discription	±iu!	1 Init Cost	Vijantitv	Hem Cost	V Cont	Hem Cont	Subtotal	Ϋ́	Subtotal VoE
225	3CC 3GD	#			OIIII COST	Qualitity	ונפווו כמפר	A. COIII.	itelli colit.	annoral	101	Subtotal FOE
10			GUIDEWAY & TRACK ELEMENTS (route miles)				\$9,064,850		\$1,245,225	\$10,310,075		\$11,139,806
	10.04		Guideway: Aerial structure				\$761,500		\$228,450	\$989,950		\$1,069,619
		10.04.01	Alignment Over Existing Bridge	TF	\$200	1523.0	\$761,500	30%	\$228,450	\$989,950	2014	\$1,069,619
	10.10		Track: Embedded				\$7,833,350		\$922,775	\$8,756,125		\$9,460,797
		10.10.01	Furnish Rail - Assume 112TRAM Block Rail	TF	\$20	19920.0	\$1,394,400	70%	\$278,880	\$1,673,280	2014	\$1,807,942
		10.10.02	Embedded Track - Construct Track Slab	Ŧ	\$320	18397.0	\$6,438,950	10%	\$643,895	\$7,082,845	2014	\$7,652,856
	10.12		Track: Special (switches, turnouts)				\$470,000		\$94,000	\$564,000		\$609,389
		10.12.01	Embedded Turnout - Furnish and Install	EA	\$175,000		\$350,000	70%	\$70,000	\$420,000	2014	\$453,801
		10.12.02	Embedded Crossing - Furnish and Install	EA	\$120,000	1.0	\$120,000	20%	\$24,000	\$144,000	2014	\$155,589
20			STATIONS, STOPS, TERMINALS, INTERMODAL (number)				\$2,000,000		\$400,000	\$2,400,000		\$2,593,146
	20.01		At-grade station, stop, shelter, mall, terminal, platform				\$2,000,000		\$400,000	\$2,400,000		\$2,593,146
		20.01.01	Streetcar Stop - side/center split	EA	\$120,000	14.0	\$1,680,000	70%	\$336,000	\$2,016,000	2014	\$2,178,243
		20.01.02	Streetcar Stop - Center shared	EA	\$160,000	2.0	\$320,000	20%	\$64,000	\$384,000	2014	\$414,903
	20.02		Aerial station, stop, shelter, mall, terminal, platform				0\$		0\$	0\$		0\$
30			SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS				\$6,920,000		\$1,384,000	\$8,304,000		\$8,972,286
	30.02		Light Maintenance Facility				\$4,000,000		\$800,000	\$4,800,000		\$5,186,293
		30.02.01	Maintenance Facility Building including office space	ST	\$4,000,000	1.0	\$4,000,000	70%	\$800,000	\$4,800,000	2014	\$5,186,293
	30.05		Yard and Yard Track				\$2,920,000		\$584,000	\$3,504,000		\$3,785,994
		30.05.01	Maintenance Facility Track/Trackwork Allowance	ST	\$1,600,000	1.0	\$1,600,000	70%	\$320,000	\$1,920,000	2014	\$2,074,517
		30.05.02	Maintenance Facility Systems allowance (OCS and substation)	ST	\$1,000,000	1.0	\$1,000,000	70%	\$200,000	\$1,200,000	2014	\$1,296,573
		30.05.03	Maintenance Facility Site Allowance	SJ	\$320,000	1.0	\$320,000	20%	\$64,000	\$384,000	2014	\$414,903
40			SITEWORK & SPECIAL CONDITIONS				\$11,708,587		\$1,799,157	\$13,507,744		\$14,431,202
	40.02		Site Utilities, Utility Relocation				\$3,444,550		\$1,033,365	\$4,477,915		\$4,674,673
		40.02.01	Utility Relocation - High Allowance (3+ or significant relocations)	TF	\$200	1400.0	\$700,000	30%	\$210,000	\$910,000	2013	\$949,985
		40.02.02	Utility Relocation - Medium Allowance (1-2 relocations)	Ŧ	\$300	1300.0	\$390,000	30%	\$117,000	\$507,000	2013	\$529,277
		40.02.03		TF	\$150	15697.0	\$2,354,550	30%	\$706,365	\$3,060,915	2013	\$3,195,411
	40.06		Pedestrian / bike access and accommodation, landscaping				\$345,000		\$103,500	\$448,500		\$484,594
		40.06.01	Pedestrian Improvement Allowance (Per Intersection)	EA	\$15,000	23.0	\$345,000	30%	\$103,500	\$448,500	2014	\$484,594
	40.07		Automobile, bus, van accessways including roads, parking lots				\$2,391,610		\$662,292	\$3,053,902		\$3,299,673
		40.07.01	Roadway Improvement Allowance	1TF	\$100	18397.0	\$1,839,700	30%	\$551,910	\$2,391,610	2014	\$2,584,081
		40.07.02	Track Drainage Allowance	Ŧ	\$20	18397.0	\$367,940	70%	\$73,588	\$441,528	2014	\$477,061
		40.07.03	Street Lighting Allowance (Adjustments, Relocations, New)	TF	\$10	18397.0	\$183,970	20%	\$36,794	\$220,764	2014	\$238,531
	40.08		Temporary Facilities and other indirect costs during construction				\$5,527,427		\$0	\$5,527,427		\$5,972,261
		40.08.01	Temporary Maintenance of Traffic	ST	2%	34546419.7	\$1,727,321	%0	0\$	\$1,727,321	2014	\$1,866,332
		40.08.02	etc.)	SI	10%	34546419.7	\$3,454,642	%0	0\$	\$3,454,642	2014	\$3,732,663
		40.08.03	Art in Transit (1% of Construction)	rs	1%	34546419.7	\$345,464	%0	\$0	\$345,464	2014	\$373,266

90		SYSTEMS					\$13,276,800		\$2,677,520	\$15,954,320		\$17,238,286
	50.01		Train control and signals				\$2,000,000		\$1,000,000	\$3,000,000		\$3,241,433
	20.0	50.01.01 Grand Bl	Grand Blvd. partial streetcar closure allowance (track/signals)	EA	\$2,000,000	1.0	\$2,000,000	20%	\$1,000,000	\$3,000,000	2014	\$3,241,433
	50.02	Traffic si	Traffic signals and crossing protection				\$2,098,400		\$419,680	\$2,518,080		\$2,720,729
	20.0		Modify Existing Traffic Signal	EA	\$75,000		\$1,350,000	70%	\$270,000	\$1,620,000	2014	\$1,750,374
	50.0		fic Signal Allowance	EA	\$175,000		\$350,000	20%	\$70,000	\$420,000	1	\$453,801
	50.0		iority Allowance	土	\$20		\$398,400	20%	\$79,680	\$478,080	2014	\$516,555
	20.0	50.02.04 New Ped	New Pedestrian Traffic Signal Allowance	EA	\$125,000	0.0	0\$	20%	0\$	0\$	i	0
	50.03	Traction	Traction power supply: substations				\$3,600,000		\$720,000	\$4,320,000		\$4,667,663
		50.03.01 Traction	Traction Power Substation (Assume 1/Track Mile or 1 per 0.5 Rt. Mile)	EA	\$900,000	4.0	\$3,600,000	70%	\$720,000	\$4,320,000	2014	\$4,667,663
	50.04	Traction	Traction power distribution: catenary and third rail				\$5,378,400		\$537,840	\$5,916,240		\$6,392,365
	20.0	50.04.01 Overhea	Overhead Trolley Wire Allowance (Poles, wires, appurtenances)	TF	\$270	19920.0	\$5,378,400	10%	\$537,840	\$5,916,240	2014	\$6,392,365
	50.05	Communications	ications				\$200,000		0\$	\$200,000		\$216,096
	20.0	50.05.01 Commun	Communications Allowance	ST	\$200,000	1.0	\$200,000	%0	0\$	\$200,000	2014	\$216,096
	20.06		Fare collection system and equipment				\$0		\$0	\$0		\$0
	20.0	50.06.01 Fare Coll	Fare Collection (none - assume on vehicle)	EA	0\$	0.0	0\$	%0	0\$	0\$	2014	\$0
	Construction	Construction Subtotal (10-50)				0.0	\$42,970,237		\$7,505,902	\$50,476,139		\$54,374,727
09		ROW, LAI	ROW, LAND, EXISTING IMPROVEMENTS				\$2,000,000		\$600,000	\$2,600,000		\$2,714,243
	60.01	Purchase	Purchase or lease of real estate				\$2,000,000		000′009\$	\$2,600,000		\$2,714,243
	9:09	60.01.01 Right of \	Right of Way Acquisition	ST	\$2,000,000	1.0	\$2,000,000	30%	\$600,000	\$2,600,000	2013	\$2,714,243
20		VEHICLES	VEHICLES (number)				\$17,200,000		\$356,000	\$17,556,000		\$18,968,866
	70.01	Light Rail					\$16,800,000		\$336,000	\$17,136,000		\$18,515,065
	70.0	70.01.01 Modern §	Modern Streetcar Vehicle (Assumes wired system)	EA	\$4,200,000	4.0	\$16,800,000	7%	\$336,000	\$17,136,000	2014	\$18,515,065
	70.07	Spare parts	irts				\$400,000		\$20,000	\$420,000		\$453,801
	70.0	70.07.01 Spare Pa	Spare Parts for New Vehicles (Per Vehicle)	EA	\$100,000	4.0	\$400,000	2%	\$20,000	\$420,000	2014	\$453,801
80		PROFESSI	PROFESSIONAL SERVICES (applies to Cats. 10-50)				\$16,040,544		0\$	\$16,040,544		\$16,897,438
	80.01	Prelimina	Preliminary Engineering				\$1,359,368		0\$	\$1,359,368		\$1,371,110
	3.08	80.01.01 Percenta	Percentage of Direct Costs SCC (10-50)	ST	2.5%	54374726.5	\$1,359,368	%0	\$0	\$1,359,368	2012	\$1,371,110
	80.02	Final Design	sign				\$3,806,231		0\$	\$3,806,231		\$3,973,476
	3.08	80.02.01 Percenta	Percentage of Direct Costs SCC (10-50)	ST	7.0%	54374726.5	\$3,806,231	%0	0\$	\$3,806,231	2013	\$3,973,476
	80.03	Project ∿	Project Management for Design and Construction				\$2,718,736		0\$	\$2,718,736		\$2,838,197
	3.08	80.03.01 Percenta	Percentage of Direct Costs SCC (10-50)	ST	2.0%	54374726.5	\$2,718,736	%0	\$0	\$2,718,736	2013	\$2,838,197
	80.04	Construc	Construction Administration & Management				\$3,262,484		\$0	\$3,262,484		\$3,525,041
	30.0	80.04.01 Percenta	Percentage of Direct Costs SCC (10-50)	ST	%0'9	54374726.5	\$3,262,484	%0	0\$	\$3,262,484	2014	\$3,525,041
	80.05		Professional Liability and other Non-Construction Insurance				\$1,631,242		\$0	\$1,631,242		\$1,702,918
	30.0	80.05.01 Percenta	Percentage of Direct Costs SCC (10-50)	rs	3.0%	54374726.5	\$1,631,242	%0	\$0	\$1,631,242	2013	\$1,702,918
	80.08	Legal; P€	Legal; Permits; Review Fees by other agencies, cities, etc.				\$1,087,495		\$0	\$1,087,495		\$1,135,279
	3.08	80.06.01 Percenta	Percentage of Direct Costs SCC (10-50)	ST	2.0%	54374726.5	\$1,087,495	%0	0\$	\$1,087,495	2013	\$1,135,279
	80.07	Surveys,	Surveys, Testing, Investigation, Inspection				\$1,087,495		0\$	\$1,087,495		\$1,135,279
	9.08	80.07.01 Percenta	Percentage of Direct Costs SCC (10-50)	ST	2.0%	54374726.5	\$1,087,495	%0	0\$	\$1,087,495	2013	\$1,135,279
	80.08	Start up					\$1,087,495		0\$	\$1,087,495		\$1,216,139
	3.08	80.08.01 Percenta	Percentage of Direct Costs SCC (10-50)	ST	2.0%	54374726.5	\$1,087,495	%0	0\$	\$1,087,495	2015	\$1,216,139
	Subtotal (10-80)	10-80)					\$78,210,781		\$8,461,902	\$86,672,683		\$92,955,273
06		ONALLOC	UNALLOCATED CONTINGENCY	ST	10%					\$8,667,268		\$9,295,527
100		FINANCE	FINANCE CHARGES						Curre	<b>Current Year Total</b>		YoE Total
	Segment Te	Segment Totals (10-100)								\$95,339,952		\$102,250,800

9/16/2011

	Main Stra	Main Street Bus Alternative							Current Vear		Inflation Rate
									2011 75 (VP)		3 20%
3	SCC Sub Item #	Hem Discription	+iui-	Unit Cost	Ouantity	Item Cost	A Cont	Hem Cont	Subtotal	YOF	Subtotal VoF
		GUIDEWAY & TRACK ELEMENTS (route miles)				0\$		0\$	\$0	!	\$0
20		STATIONS. STOPS. TERMINALS. INTERMODAL (number)				\$2.760.000		\$828,000	\$3.588.000		\$3.810.641
⊢	20.01					\$2,760,000		\$828,000	\$3,588,000		\$3,810,641
_	20.01.01	r	EA	\$100,000	24.0	\$2,400,000	30%	\$720,000	_	2013.5	\$3,313,601
	20.01.02	Bus Stop - Shared	E	\$150,000	0:0	\$0	30%	\$0	\$0 20	2013.5	\$0
	20.01.03		EA	\$15,000	24.0	\$360,000	30%	\$108,000	\$468,000 20	2013.5	497040.1426
30		SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS				0\$		0\$	0\$		\$0
Ë	30.02	Light Maintenance Facility				0\$		0\$	0\$		0\$
<u> </u>	30.02.01	Maintenance Facility Building/site expansion	rs	\$150,000	0.0	0\$	30%	0\$	\$0 20	2013.5	\$0
40		SITEWORK & SPECIAL CONDITIONS				\$3,365,033		\$581,598	\$3,946,631		\$4,197,648
	40.02	Site Utilities, Utility Relocation				\$15,000		\$4,500	\$19,500		\$20,710
<u> </u>	40.02.01	Stormwater/Drainage Allowance (where modifying flowline)	EA	\$5,000	3.0	\$15,000	30%	\$4,500	\$19,500 20	2013.5	\$20,710
	40.06	Pedestrian / bike access and accommodation, landscaping				\$645,610		\$193,683	\$839,293		\$897,495
_	40.06.01	Pedestrian Improvement Allowance (Per Intersection)	EA	\$15,000	26.0	\$390,000	30%	\$117,000		2013.5	\$538,460
	40.06.02		土	\$10	25561.0	\$255,610	30%	\$76,683	<u> </u>	2014	359035.1591
	40.07	Automobile, bus, van accessways including roads, parking lots				\$1,278,050		\$383,415	\$1,661,465		\$1,764,562
	40.07.01	Roadway Improvement Allowance	TF	\$20	25561.0	\$1,278,050	30%	\$383,415	\$1,661,465 20	2013.5	\$1,764,562
	40.08	Temporary Facilities and other indirect costs during construction				\$1,426,373		0\$	\$1,426,373		\$1,514,881
	40.08.01	Temporary Maintenance of Traffic	ST	0\$	10188376.8	\$509,419	%0	0\$	\$509,419 20	2013.5	\$541,029
	40.08.02		rs	\$0	10188376.8	\$815,070	%0	0\$		2013.5	\$865,647
	40.08.03	Art in Transit (1% of Construction)	LS	\$0	10188376.8	\$101,884	%0	\$0	\$101,884 20	013.5	\$108,206
20		SYSTEMS				\$2,676,220		\$802,866	\$3,479,086		\$3,694,969
	50.02	Traffic signals and crossing protection				\$1,236,220		\$370,866	\$1,607,086		\$1,706,808
_	50.02.01	Modify Existing Traffic Signal For Transit signal and Queue Jump	EA	\$50,000	2.0	\$250,000	30%	\$75,000	\$325,000 20	2013.5	\$345,167
	50.02.02	New Pedestrian Traffic Signal Allowance	EA	\$125,000	1.0	\$125,000	30%	\$37,500	\$162,500 20	2013.5	\$172,583
	50.02.03		TF	\$20	25561.0	\$511,220	30%	\$153,366	\$664,586 20	013.5	\$705,825
	50.02.04	New Traffic Signal	EA	\$175,000	2.0	\$350,000	30%	\$105,000	\$455,000 20	2013.5	483233.472
	50.06	Fare collection system and equipment				\$1,440,000		\$432,000	\$1,872,000		\$1,988,161
	50.06.01	Fare Collection Allowance (at each stop)	EA	\$60,000	24.0	\$1,440,000	30%	\$432,000	\$1,872,000 20	2013.5	\$1,988,161
ט	Construction Subtotal (10-50)	ubtotal (10-50)			0.0	\$8,801,253		\$2,212,464	\$11,013,717		\$11,703,258

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2 of 4

	ROW, LAND, EXISTING IMPROVEMENTS  Burchase or lease of real exists				0\$		0\$	0\$		\$0
Right of	Right of Way Acquisition	SF	\$80	0:0	0\$	30%	0\$	0\$	2013	0\$
VEHIC	VEHICLES (number)				\$2,800,000		\$280,000	\$3,080,000		\$3,215,334
Bus					\$2,650,000		\$265,000	\$2,915,000		\$3,043,084
Moc	Modern BRT Vehicle	EA \$!	\$530,000	5.0	\$2,650,000	10%	\$265,000	\$2,915,000	2013	\$3,043,084
Spa	Spare parts				\$150,000		\$15,000	\$165,000		\$172,250
Sp	Spare Parts for New Vehicles (Per Vehicle)	EA	\$30,000	5.0	\$150,000	10%	\$15,000	\$165,000	2013	\$172,250
H.	PROFESSIONAL SERVICES (applies to Cats. 10-50)				\$3,452,461		0\$	\$3,452,461		\$3,619,888
P	Preliminary Engineering				\$292,581		0\$	\$292,581		\$295,109
ď	Percentage of Direct Costs SCC (10-50)	ΓS	3%	11703258.2	\$292,581	%0	0\$	\$292,581	2012	\$295,109
ΙĒ	Final Design				\$819,228		0\$	\$819,228		\$840,640
Ь	Percentage of Direct Costs SCC (10-50)	SJ	7%	11703258.2	\$819,228	%0	0\$	\$819,228	2012.5	\$840,640
Д	Project Management for Design and Construction				\$585,163		0\$	\$585,163		\$610,875
Ь	Percentage of Direct Costs SCC (10-50)	SJ	2%	11703258.2	\$585,163	%0	0\$	\$585,163	2013	\$610,875
O	Construction Administration & Management				\$702,195		0\$	\$702,195		\$758,707
_	Percentage of Direct Costs SCC (10-50)	SJ	%9	11703258.2	\$702,195	%0	0\$	\$702,195	2014	\$758,707
ч	Professional Liability and other Non-Construction Insurance				\$351,098		0\$	\$351,098		\$372,884
Ь	Percentage of Direct Costs SCC (10-50)	ST	3%	11703258.2	\$351,098	%0	0\$	\$351,098	2013.5	\$372,884
_	Legal; Permits; Review Fees by other agencies, cities, etc.				\$234,065		0\$	\$234,065		\$240,183
4	Percentage of Direct Costs SCC (10-50)	rs	7%	11703258.2	\$234,065	%0	0\$	\$234,065	2012.5	\$240,183
(O)	Surveys, Testing, Investigation, Inspection				\$234,065		0\$	\$234,065		\$248,589
Ь	Percentage of Direct Costs SCC (10-50)	ST	7%	11703258.2	\$234,065	%0	0\$	\$234,065	2013.5	\$248,589
(O)	Start up				\$234,065		0\$	\$234,065		\$252,902
Ь	Percentage of Direct Costs SCC (10-50)	ST	7%	11703258.2	\$234,065	%0	0\$	\$234,065	2014	\$252,902
					\$15,053,714		\$2,492,464	\$17,546,178		\$18,538,481
Ď	UNALLOCATED CONTINGENCY	T.S	10%					\$1,754,618		\$1,853,848
프	FINANCE CHARGES						Curi	<b>Current Year Total</b>		YoE Total
(10	Segment Totals (10-100)							\$19,300,796		\$20,392,329

		Grand Blvd	Grand Blvd Bus Alternative						Current Year	Inflation Rate
									2011.75 (YR)	3.50%
SCC	SCC Suk	SCC Sub Item #	Item Discription	Unit Unit Cost	Quantity	Item Cost A. Cont.		Item Cont.	Subtotal YoE	Subtotal YoE
10			GUIDEWAY & TRACK ELEMENTS (route miles)			0\$		0\$	0\$	0\$
20			STATIONS, STOPS, TERMINALS, INTERMODAL (number)			\$2,235,000	\$	\$670,500	\$2,905,500	\$3,085,791
	20.01		At-grade station, stop, shelter, mall, terminal, platform			\$2,235,000	\$	\$670,500	\$2,905,500	\$3,085,791
		20.01.01	Bus Stop - Single Direction	EA \$100,000	18.0	\$1,800,000	\$ %08	\$540,000	\$2,340,000 2013.5	\$2,485,201
		20.01.02		EA \$150,000	1.0	\$150,000		\$45,000	\$195,000 2013.5	\$207,100
		20.01.03	Concrete Bus Pad	EA \$15,000	19.0	\$285,000		\$85,500	\$370,500 2013.5	393490.1129
30			SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS			0\$		0\$	0\$	0\$
	30.02	•	Light Maintenance Facility			0\$		0\$	0\$	0\$
		30.02.01	Maintenance Facility Building/site expansion	LS \$150,000	0.0	0\$	30%	0\$	\$0 2013.5	0\$
40			SITEWORK & SPECIAL CONDITIONS			\$2,978,230	\$	\$535,074	\$3,513,304	\$3,736,913
	40.02		Site Utilities, Utility Relocation			\$35,000		\$10,500	\$45,500	\$48,323
		40.02.01	Stormwater/Drainage Allowance (where modifying flowline)	EA \$5,000	7.0	\$32,000	30%	\$10,500	\$45,500 2013.5	\$48,323
	40.06		Pedestrian / bike access and accommodation, landscaping			\$578,930	\$	\$173,679	\$752,609	\$804,913
		40.06.01	40.06.01  Pedestrian Improvement Allowance (Per Intersection)	EA \$15,000	23.0	\$345,000	\$ %08	\$103,500	\$448,500 2013.5	\$476,330
		40.06.02	Streetscaping allowance	TF \$10	23393.0	\$233,930	30%	\$70,179	\$304,109 2014	328582.9771
	40.07		Automobile, bus, van accessways including roads, parking lots			\$1,169,650	\$	\$350,895	\$1,520,545	\$1,614,897
		40.07.01	Roadway Improvement Allowance	TF \$50	23393.0	\$1,169,650	\$ %08	\$350,895	\$1,520,545 2013.5	\$1,614,897
	40.08	8	Temporary Facilities and other indirect costs during construction			\$1,194,650		0\$	\$1,194,650	\$1,268,779
		40.08.01	Temporary Maintenance of Traffic	0\$ ST	8533210.8	\$426,661	%0	0\$	\$426,661 2013.5	
		40.08.02		O\$ ST	8533210.8	\$682,657	%0	0\$	\$682,657 2013.5	
		40.08.03		LS \$0	8533210.8	\$85,332	%0	\$0	\$85,332 2013.5	\$90,627

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20		SYSTEMS			\$2,157,860		\$647,358	\$2,805,218		\$2,979,286
	50.05	Traffic signals and crossing protection			\$1,017,860		\$302,358	\$1,323,218		\$1,405,326
		50.02.01 Modify Existing Traffic Signal For Transit signal and Queue Jump	EA \$50,000	4.0	\$200,000	30%	\$60,000	\$260,000	2013.5	\$276,133
		50.02.02 New Pedestrian Traffic Signal Allowance	EA \$125,000	0.0	\$0	30%	0\$	\$0	2013.5	\$0
				23393.0	\$467,860	30%	\$140,358	\$608,218	2013.5	\$645,959
		50.02.04 New Traffic Signal	EA \$175,000	2.0	\$350,000	30%	\$105,000	\$455,000		483233.472
	20.06	Fare collection system and equipment			\$1,140,000		\$342,000	\$1,482,000		\$1,573,960
		50.06.01   Fare Collection Allowance (at each stop)	EA \$60,000	19.0	\$1,140,000	30%	\$342,000	\$1,482,000	2013.5	\$1,573,960
	Const	Construction Subtotal (10-50)		0.0	\$7,371,090		\$1,852,932	\$9,224,022		\$9,801,990
09		ROW, LAND, EXISTING IMPROVEMENTS			0\$		0\$	0\$		0\$
	60.01	Purchase or lease of real estate			0\$		0\$	0\$		0\$
		60.01.01 Right of Way Acquisition	SF \$80	0.0	0\$	30%	0\$	0\$	2013	0\$
2		VEHICLES (number)			\$2,800,000		\$280,000	\$3,080,000		\$3,215,334
	70.04	Bus			\$2,650,000		\$265,000	\$2,915,000		\$3,043,084
		70.04.01   Modern BRT Vehicle	EA \$530,000	5.0	\$2,650,000	10%	\$265,000	\$2,915,000	2013	\$3,043,084
	70.07	Spare parts			\$150,000		\$15,000	\$165,000		\$172,250
		70.07.01   Spare Parts for New Vehicles (Per Vehicle)	EA \$30,000	5.0	\$150,000	10%	\$15,000	\$165,000	2013	\$172,250
80		PROFESSIONAL SERVICES (applies to Cats. 10-50)			\$2,891,587		0\$	\$2,891,587		\$3,031,815
	80.01	Preliminary Engineering			\$245,050		0\$	\$245,050		\$247,166
		80.01.01 Percentage of Direct Costs SCC (10-50)	%E 3%	9801990.2	\$245,050	%0	0\$	\$245,050	2012	\$247,166
	80.02	Final Design			\$686,139		0\$	\$686,139		\$704,073
		80.02.01   Percentage of Direct Costs SCC (10-50)	%L S7	9801990.2	\$686,139	%0	0\$	\$686,139	2012.5	\$704,073
	80.03	Project Management for Design and Construction			\$490,100		0\$	\$490,100		\$511,634
		80.03.01 Percentage of Direct Costs SCC (10-50)	%S 27	9801990.2	\$490,100	%0	0\$	\$490,100	2013	\$511,634
	80.04	Construction Administration & Management			\$588,119		0\$	\$588,119		\$635,450
		80.04.01 Percentage of Direct Costs SCC (10-50)	%9 ST	9801990.2	\$588,119	%0	0\$	\$588,119	2014	\$635,450
	80.05	Professional Liability and other Non-Construction Insurance			\$294,060		0\$	\$294,060		\$312,307
		80.05.01 Percentage of Direct Costs SCC (10-50)	%E 3%	9801990.2	\$294,060	%0	0\$	\$294,060	2013.5	\$312,307
	80.06	Legal; Permits; Review Fees by other agencies, cities, etc.			\$196,040		0\$	\$196,040		\$201,164
		80.06.01 Percentage of Direct Costs SCC (10-50)	LS 2%	9801990.2	\$196,040	%0	0\$	\$196,040	2012.5	\$201,164
	80.07	Surveys, Testing, Investigation, Inspection			\$196,040		0\$	\$196,040		\$208,204
		80.07.01   Percentage of Direct Costs SCC (10-50)	LS 2%	9801990.2	\$196,040	%0	0\$	\$196,040	2013.5	\$208,204
	80.08	Start up			\$196,040		0\$	\$196,040		\$211,817
		80.08.01   Percentage of Direct Costs SCC (10-50)	LS 2%	9801990.2	\$196,040	%0	0\$	\$196,040	2014	\$211,817
	Subto	Subtotal (10-80)			\$13,062,677		\$2,132,932	\$15,195,609		\$16,049,139
06		UNALLOCATED CONTINGENCY	LS 10%					\$1,519,561		\$1,604,914
100		FINANCE CHARGES					Curi	<b>Current Year Total</b>		YoE Total
	Segme	Segment Totals (10-100)						\$16,715,169		\$17,654,053



# **Downtown Corridor Alternatives Analysis**







MODERN STREETCAR

**ENHANCED BUS** 

### **Volume 2: Conceptual Alignment Drawings**

**September 16, 2011** 

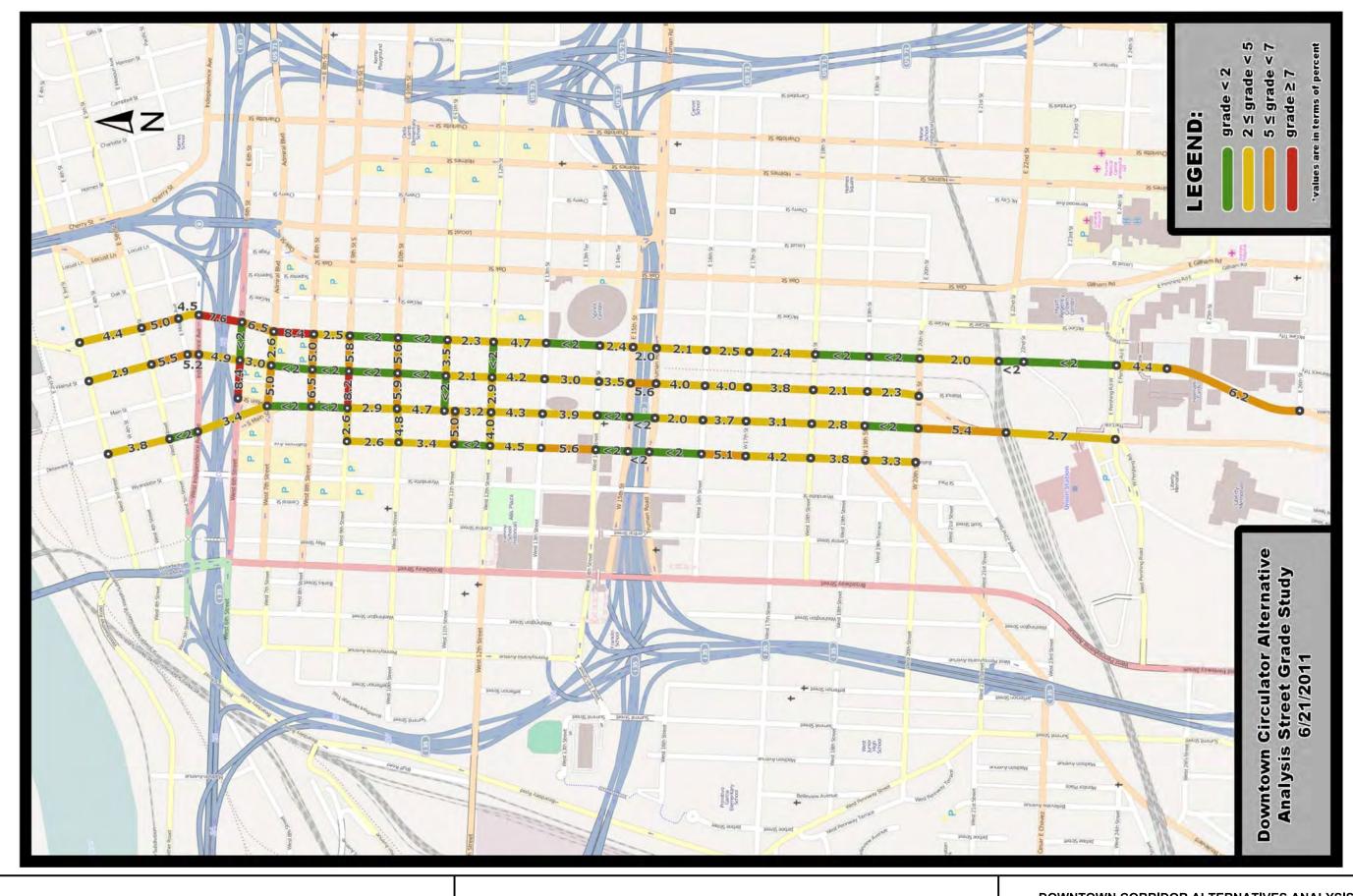


Prepared By – HDR Engineering, Inc.

GENERAL SHEETS	
EXISTING STREET GRADE MAP	G-1
STREETCAR ALTERNATIVES SHE	ETS
MAIN STREET	
DETAILED STUDY AREA LAYOUT SHEETS	MS-1 THRU MS-8
DETAILED STUDY AREA CROSS SECTION SHEETS	MS-9 THRU MS-12
GRAND BOULEVARD	
DETAILED STUDY AREA LAYOUT SHEETS	GS-1 THRU GS-7
DETAILED STUDY AREA CROSS SECTION SHEETS	GS-8 THRU GS-16
BUS ALTERNATIVES SHEETS	
MAIN STREET	
DETAILED STUDY AREA LAYOUT SHEETS	MB-1 THRU MB-9
DETAILED STUDY AREA CROSS SECTION SHEETS	MB-10 THRU MB-13
GRAND BOULEVARD	·
DETAILED STUDY AREA LAYOUT SHEETS	GB-1 THRU GB-8
DETAILED STUDY AREA CROSS SECTION SHEETS	GB-9 THRU GB-17















DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS

CONCEPTUAL ENGINEERING

**EXISTING STREET GRADE** 

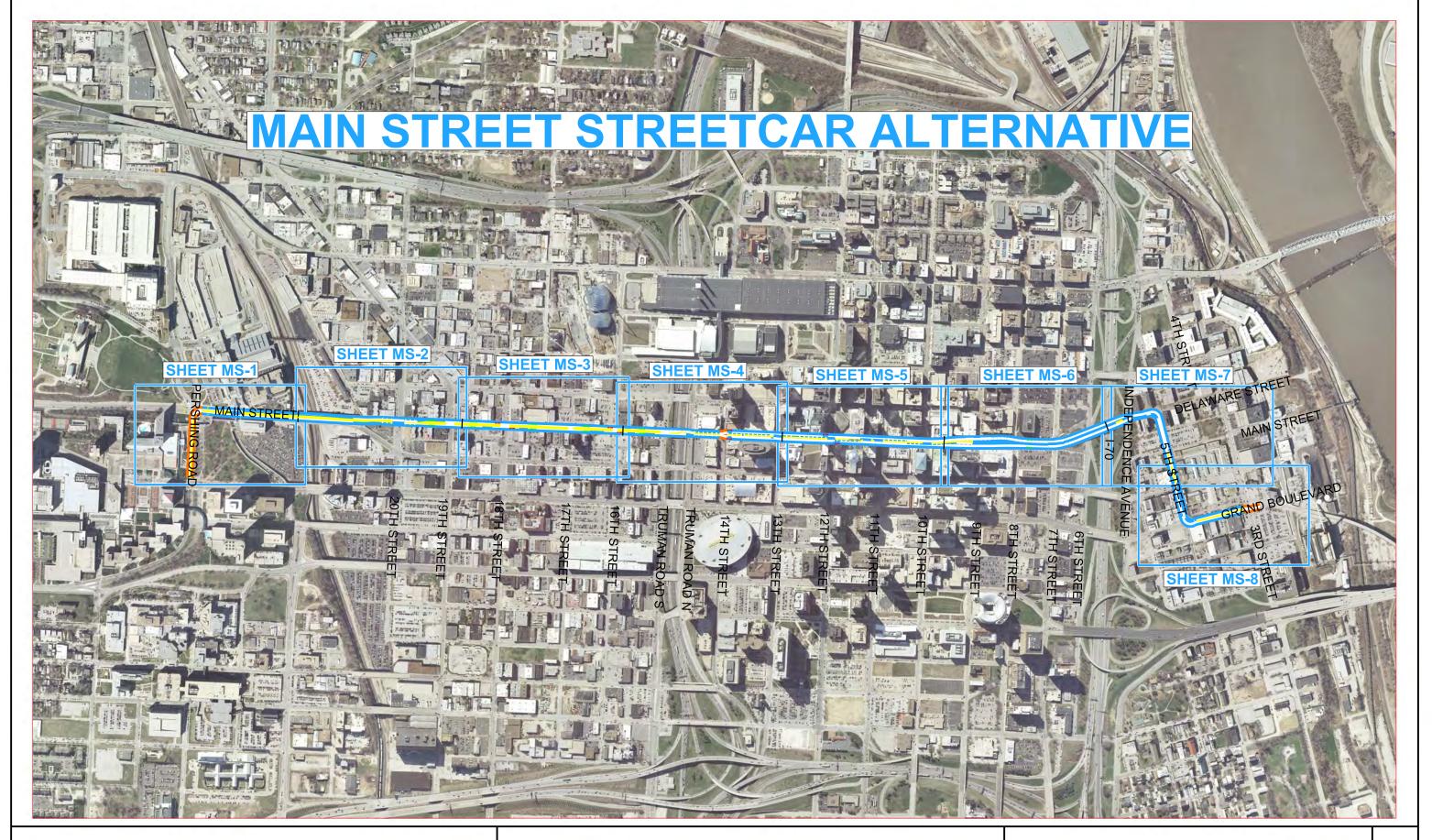
SHEET G-1 OF

# **Downtown Corridor Alternatives Analysis**



# STREETCAR ALTERNATIVES













DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS

**CONCEPTUAL ENGINEERING** 

DETAILED STUDY AREA
MAIN STREET SEGMENT
STREETCAR LAYOUT SHEET INDEX



POTENTIAL STREETCAR STATION AREA



TRANSIT-ONLY PHASE REQUIRED





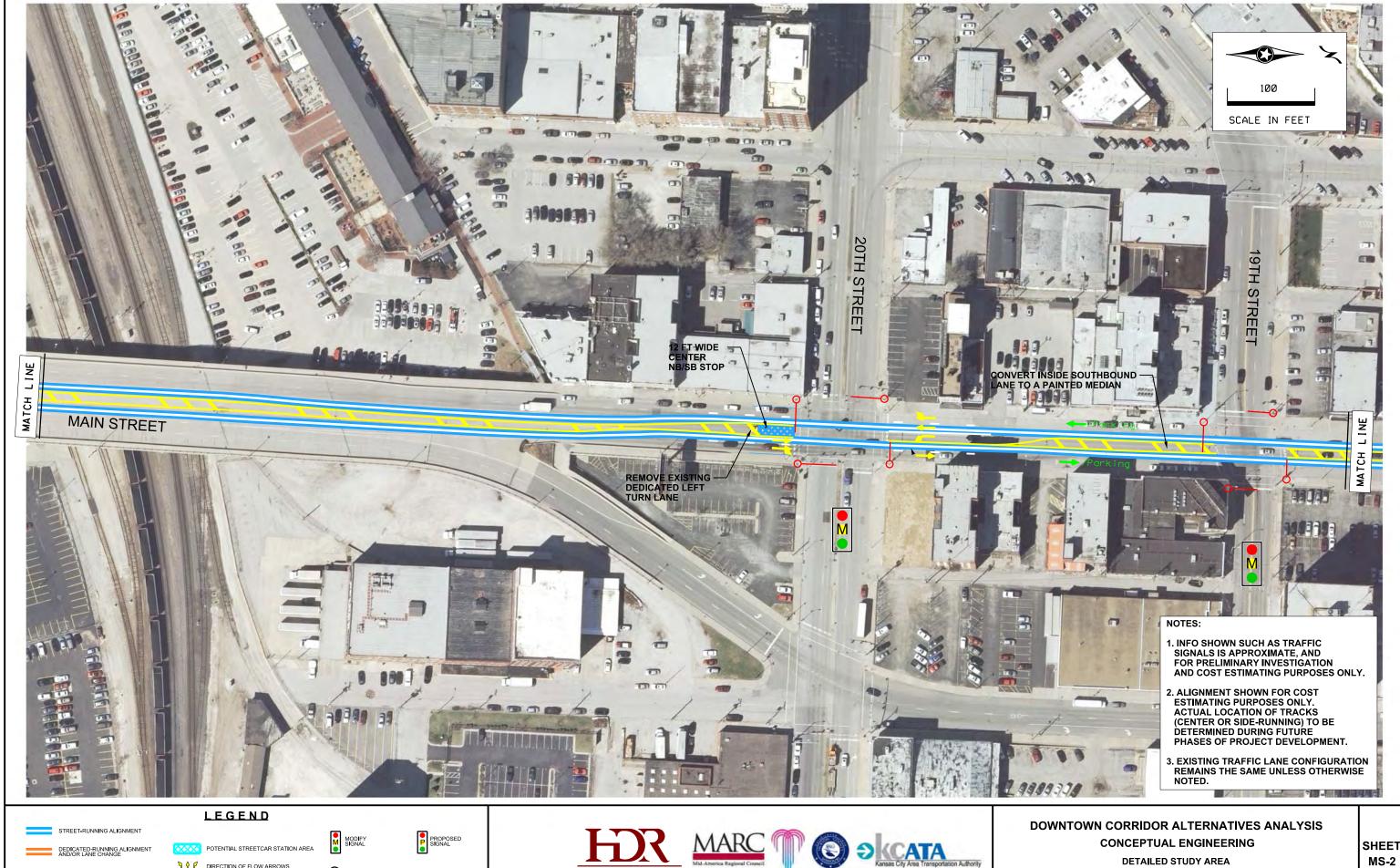






# **CONCEPTUAL ENGINEERING**

DETAILED STUDY AREA MAIN STREET SEGMENT SHEET MS-1 OF MS-12



EXISTING TRAFFIC SIGNAL

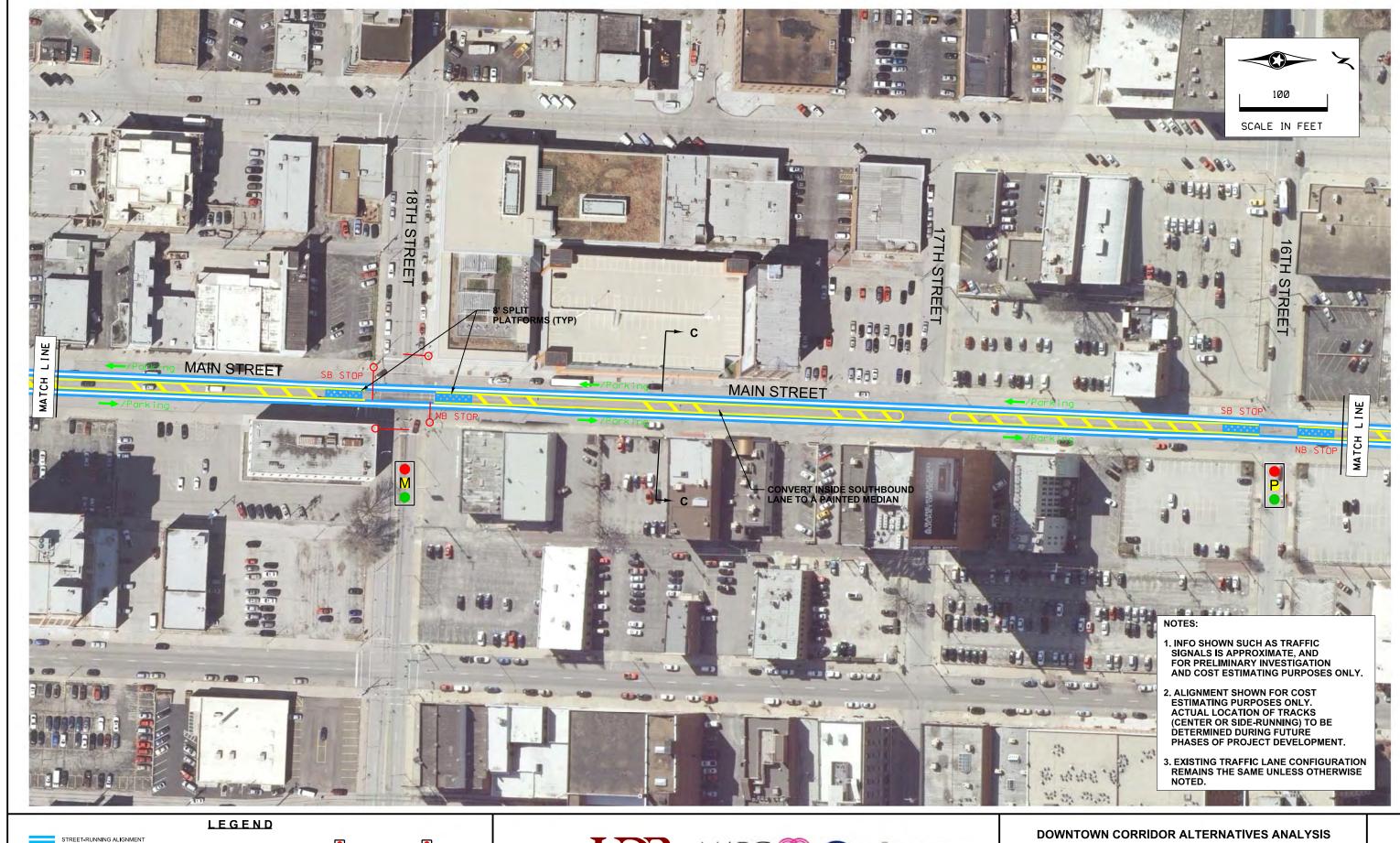
EXISTING TRAFFIC SIGNAL AND MAST ARM

The direction of flow arrows

TRANSIT-ONLY PHASE REQUIRED

**DETAILED STUDY AREA** MAIN STREET SEGMENT

MS-2 OF MS-12



EXISTING TRAFFIC SIGNAL EXISTING TRAFFIC SIGNAL AND MAST ARM

The direction of flow arrows





TRANSIT-ONLY PHASE REQUIRED







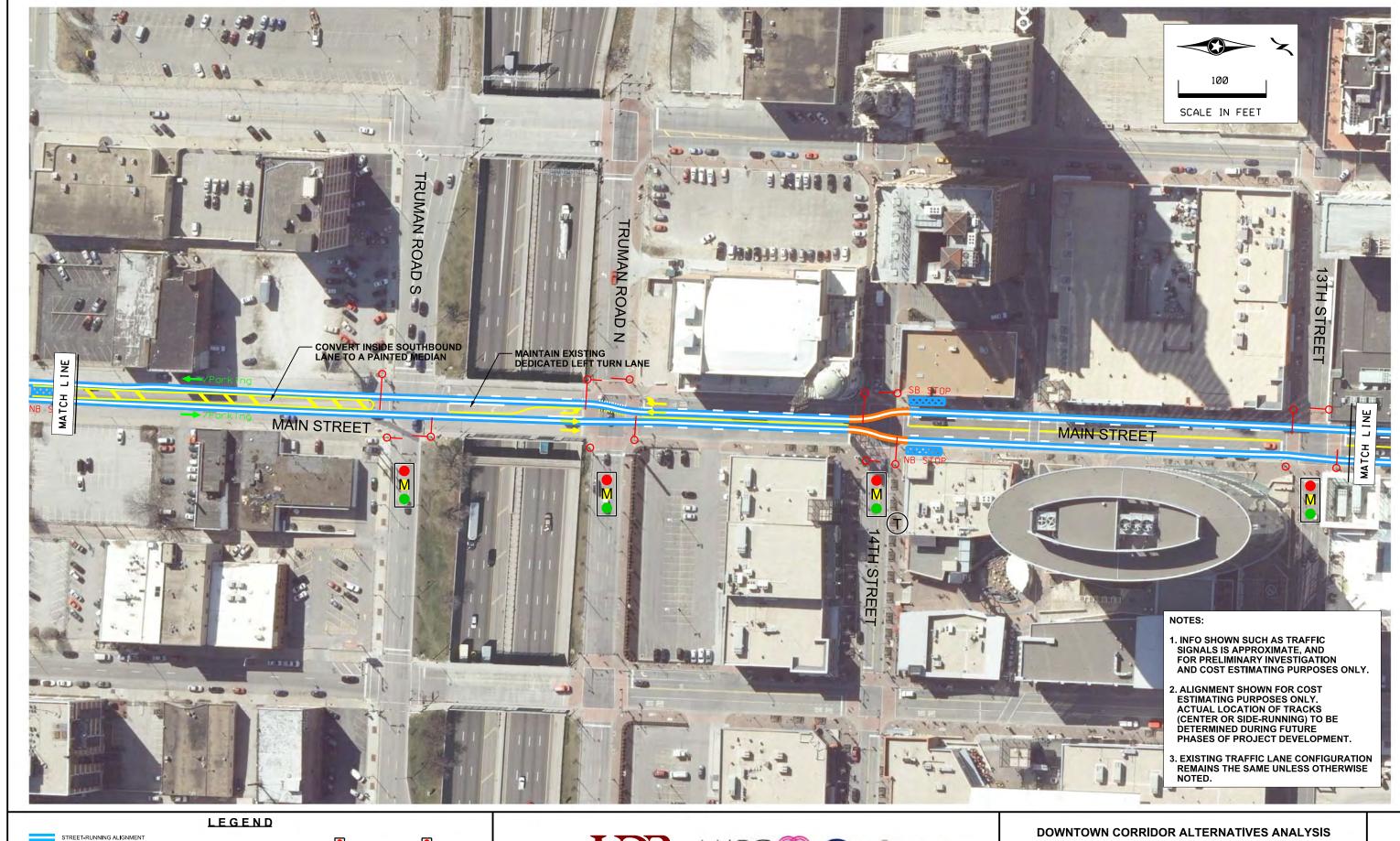






# **CONCEPTUAL ENGINEERING**

**DETAILED STUDY AREA** MAIN STREET SEGMENT SHEET MS-3 OF





DEDICATED-RUNNING ALIGNMENT AND/OR LANE CHANGE

POTENTIAL STREETCAR STATION AREA



TRANSIT-ONLY PHASE REQUIRED







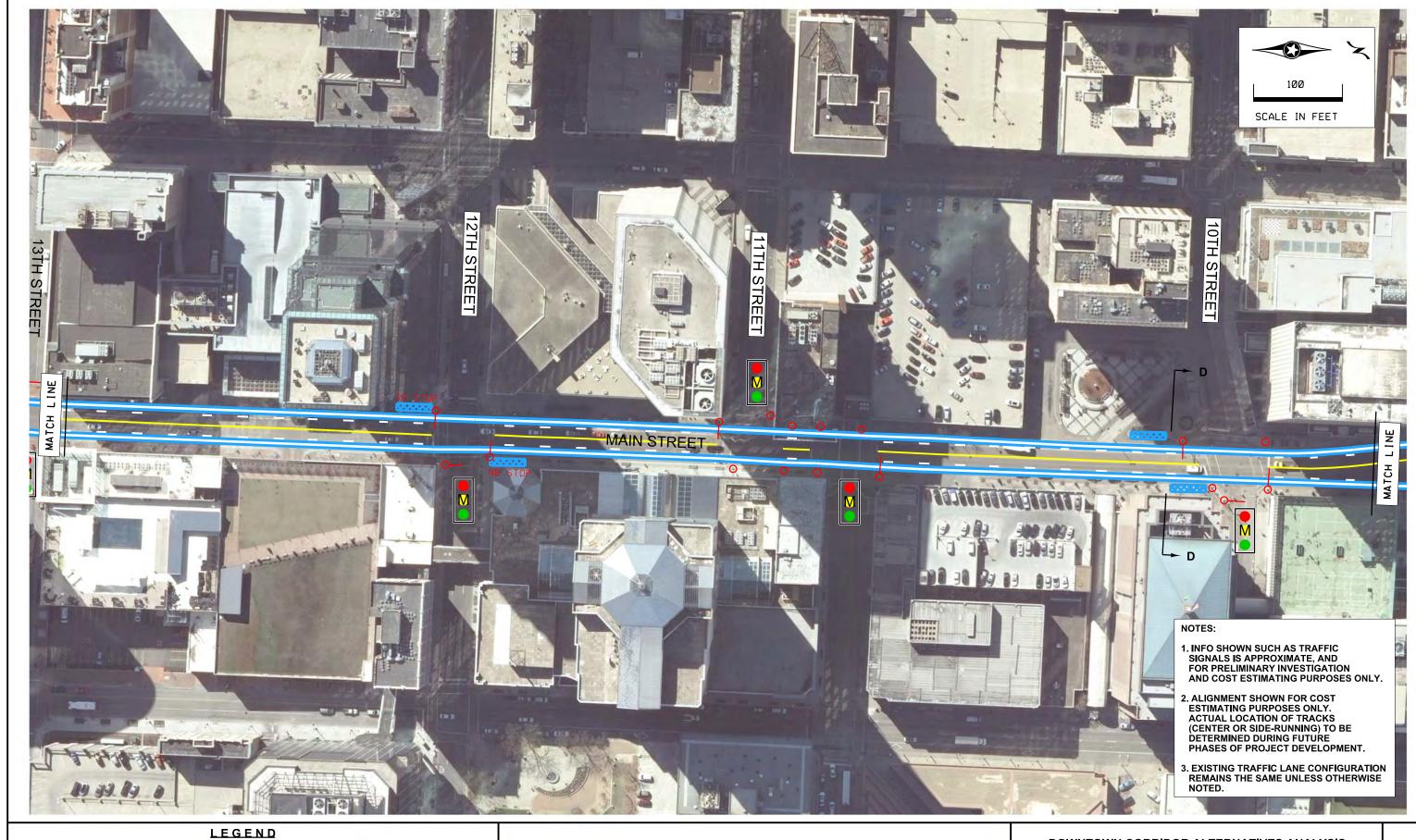






## **CONCEPTUAL ENGINEERING**

**DETAILED STUDY AREA** MAIN STREET SEGMENT SHEET MS-4 OF





DEDICATED-RUNNING ALIGNMENT AND/OR LANE CHANGE POTENTIAL STREETCAR STATION AREA



TRANSIT-ONLY PHASE REQUIRED











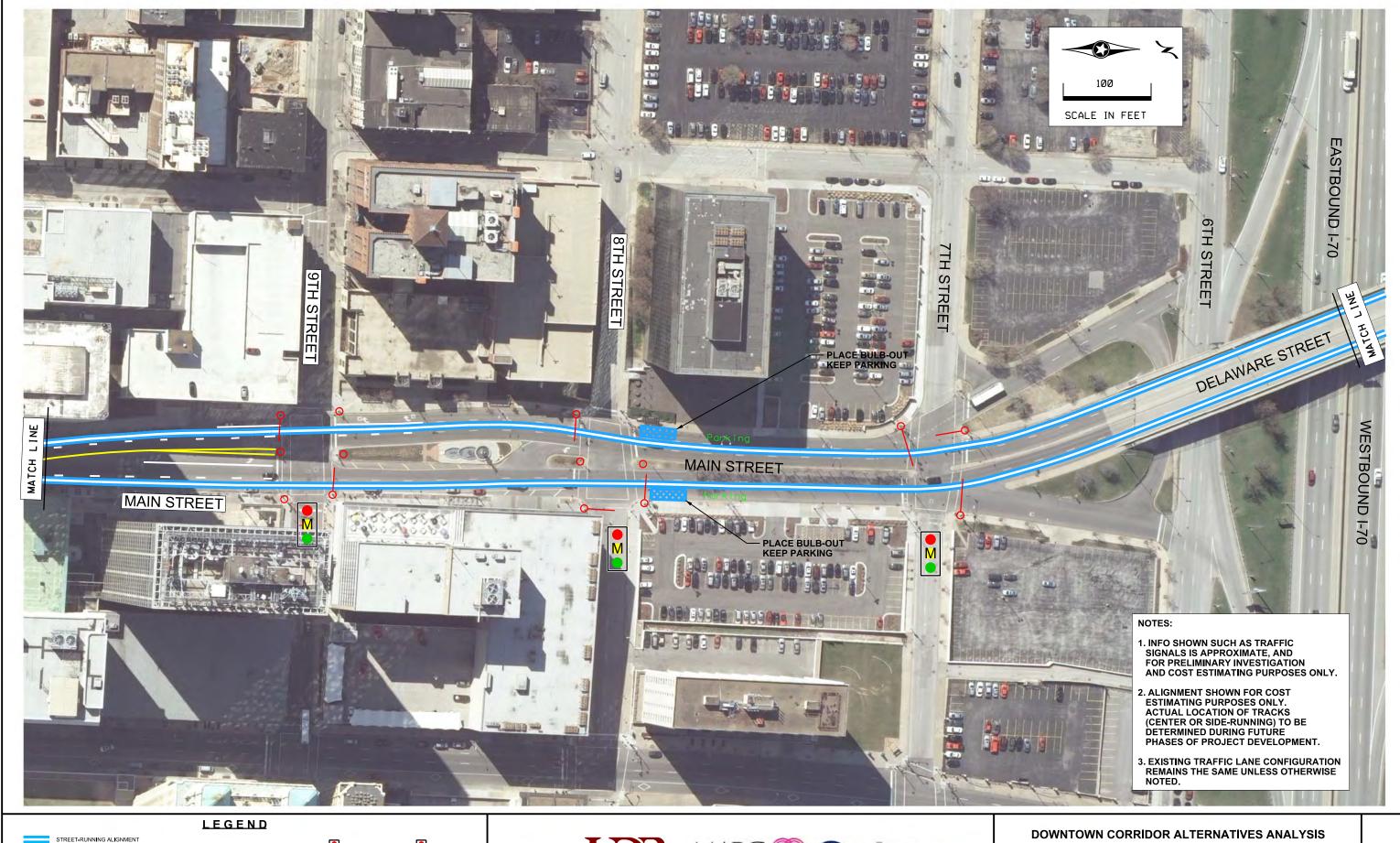


### DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING

DETAILED STUDY AREA MAIN STREET SEGMENT

AREA MS-5
GMENT OF
MS-12

SHEET



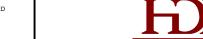


DEDICATED-RUNNING ALIGNMENT AND/OR LANE CHANGE



TRANSIT-ONLY PHASE REQUIRED







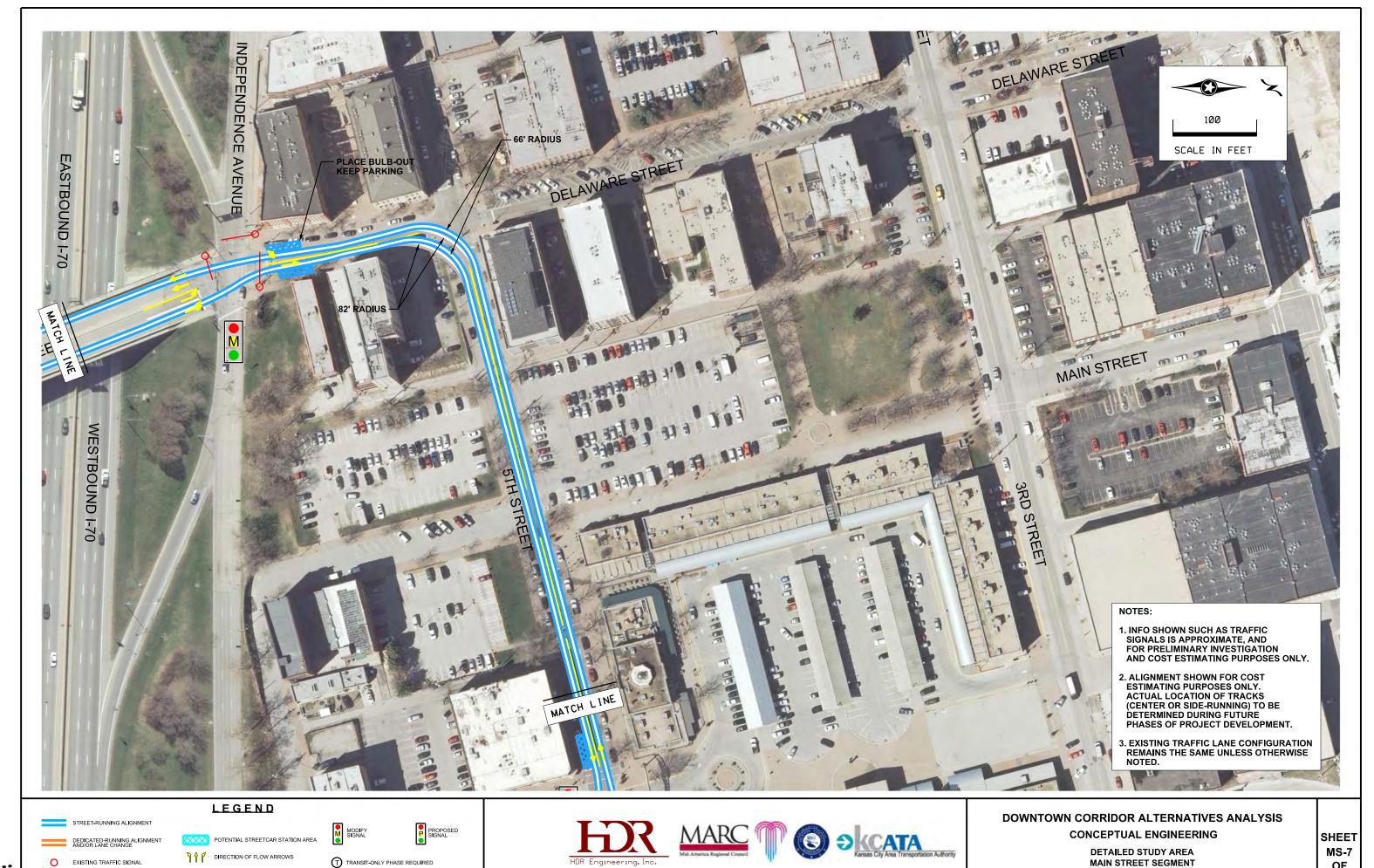






#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

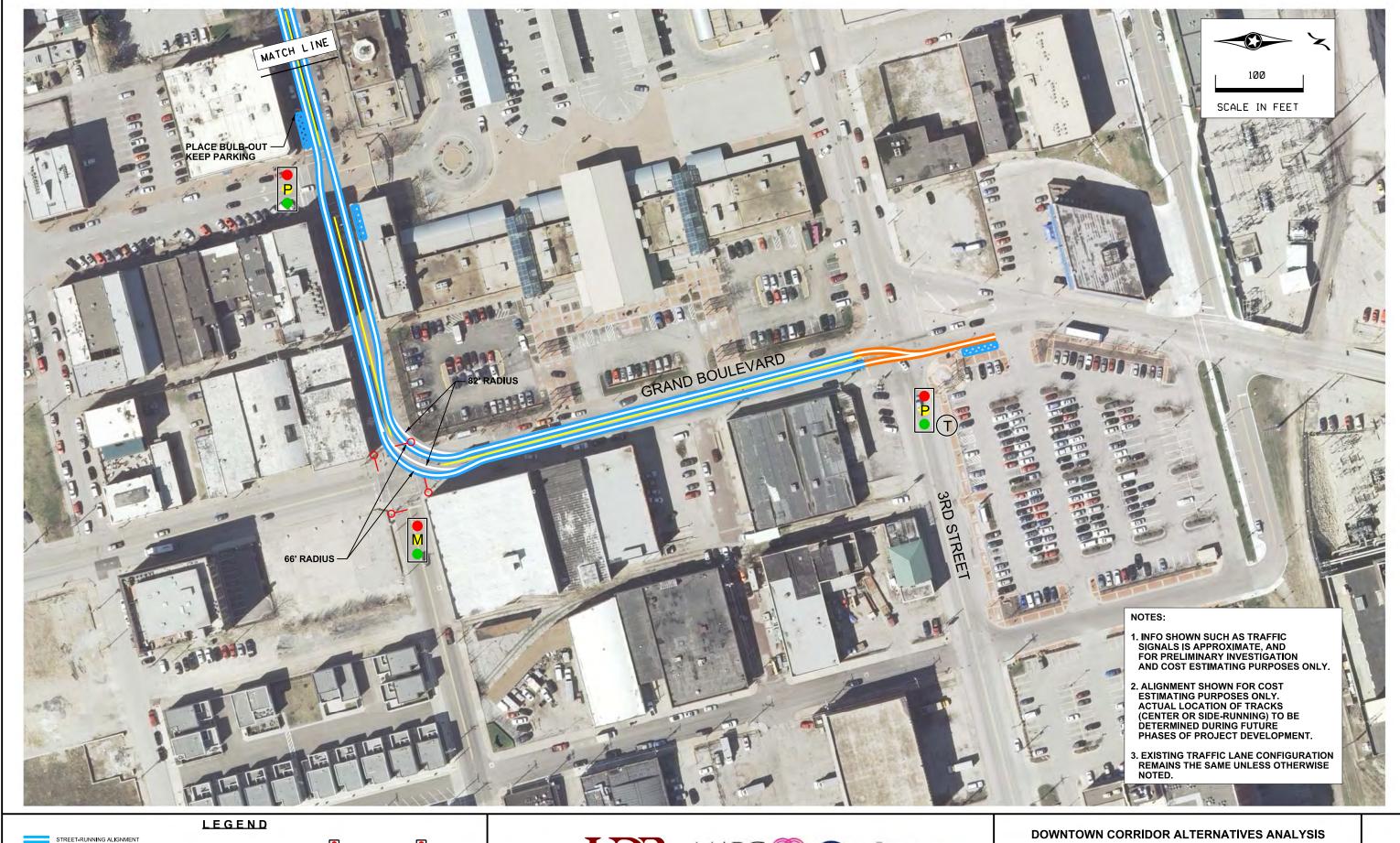
**DETAILED STUDY AREA** MAIN STREET SEGMENT SHEET MS-6 OF MS-12



OF

MS-12

EXISTING TRAFFIC SIGNAL AND MAST ARM





DEDICATED-RUNNING ALIGNMENT AND/OR LANE CHANGE

POTENTIAL STREETCAR STATION AREA



TRANSIT-ONLY PHASE REQUIRED





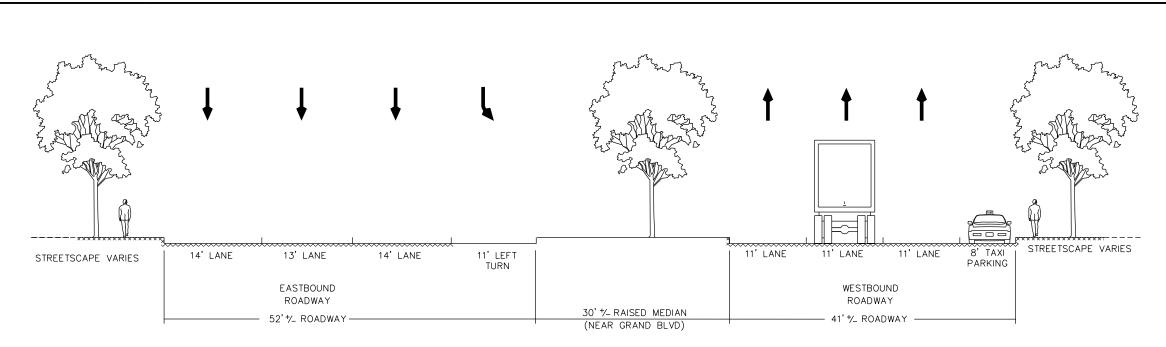




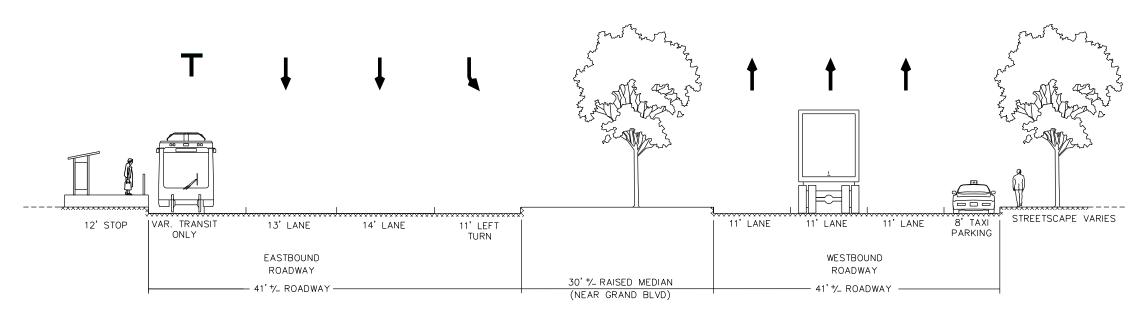


#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

**DETAILED STUDY AREA** MAIN STREET SEGMENT



#### EXISTING TYPICAL SECTION - PERSHING ROAD WEST OF GRAND BOULEVARD



#### PROPOSED TYPICAL SECTION - PERSHING ROAD WEST OF GRAND BOULEVARD

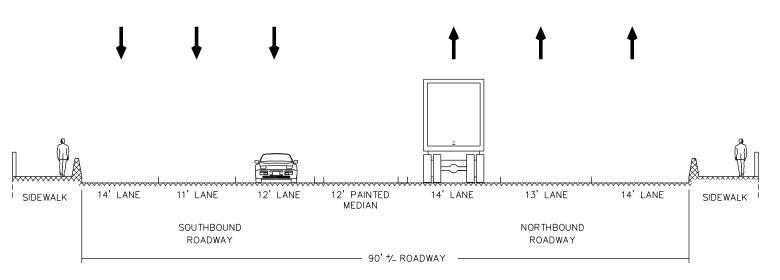
TYPICAL SECTION A-A. SEE SHEET MS-1.



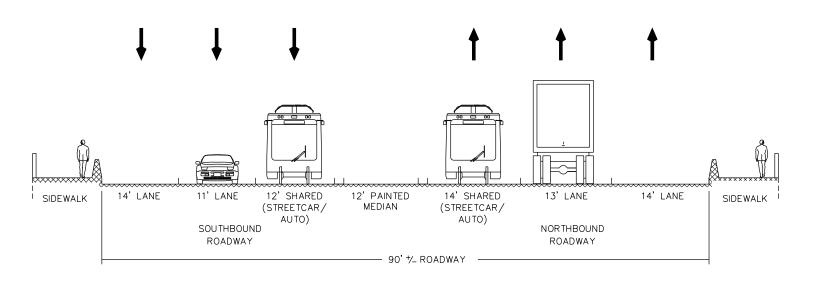








#### EXISTING TYPICAL SECTION - MAIN STREET ON BRIDGE OVER RAILWAY



#### PROPOSED TYPICAL SECTION - MAIN STREET ON BRIDGE OVER RAILWAY

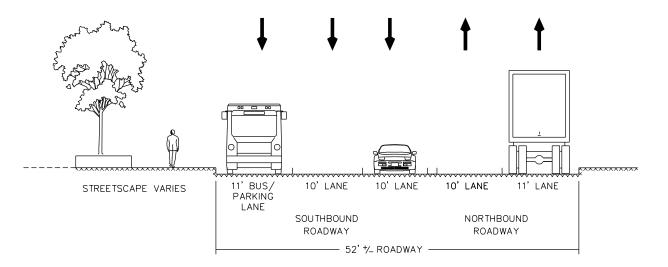
TYPICAL SECTION B-B. SEE SHEET MS-1.



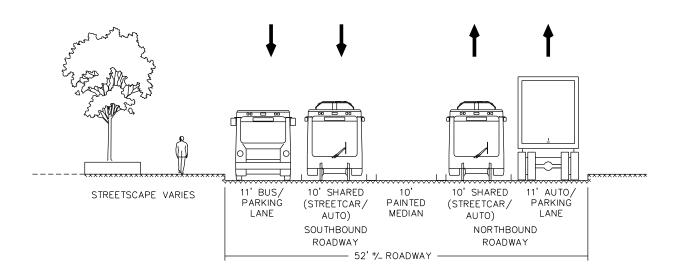








#### EXISTING TYPICAL SECTION - MAIN STREET SOUTH OF 17TH STREET



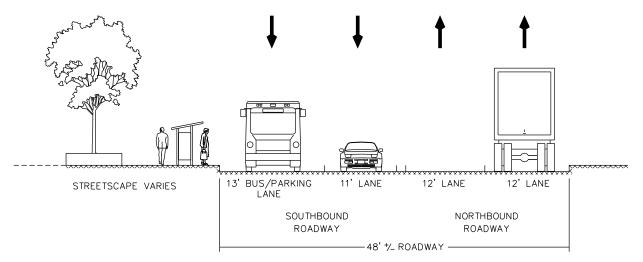
## PROPOSED TYPICAL SECTION - MAIN STREET SOUTH OF 17TH STREET TYPICAL SECTION C-C. SEE SHEET MS-3.



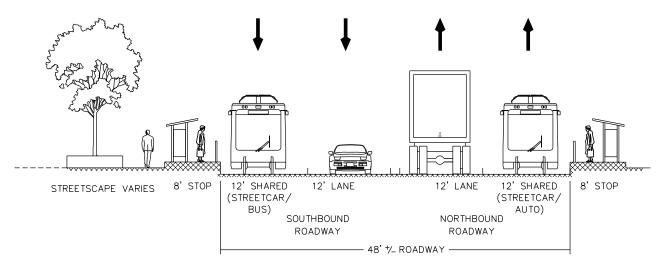








EXISTING TYPICAL SECTION - MAIN STREET SOUTH OF 12TH STREET



PROPOSED TYPICAL SECTION - MAIN STREET SOUTH OF 12TH STREET

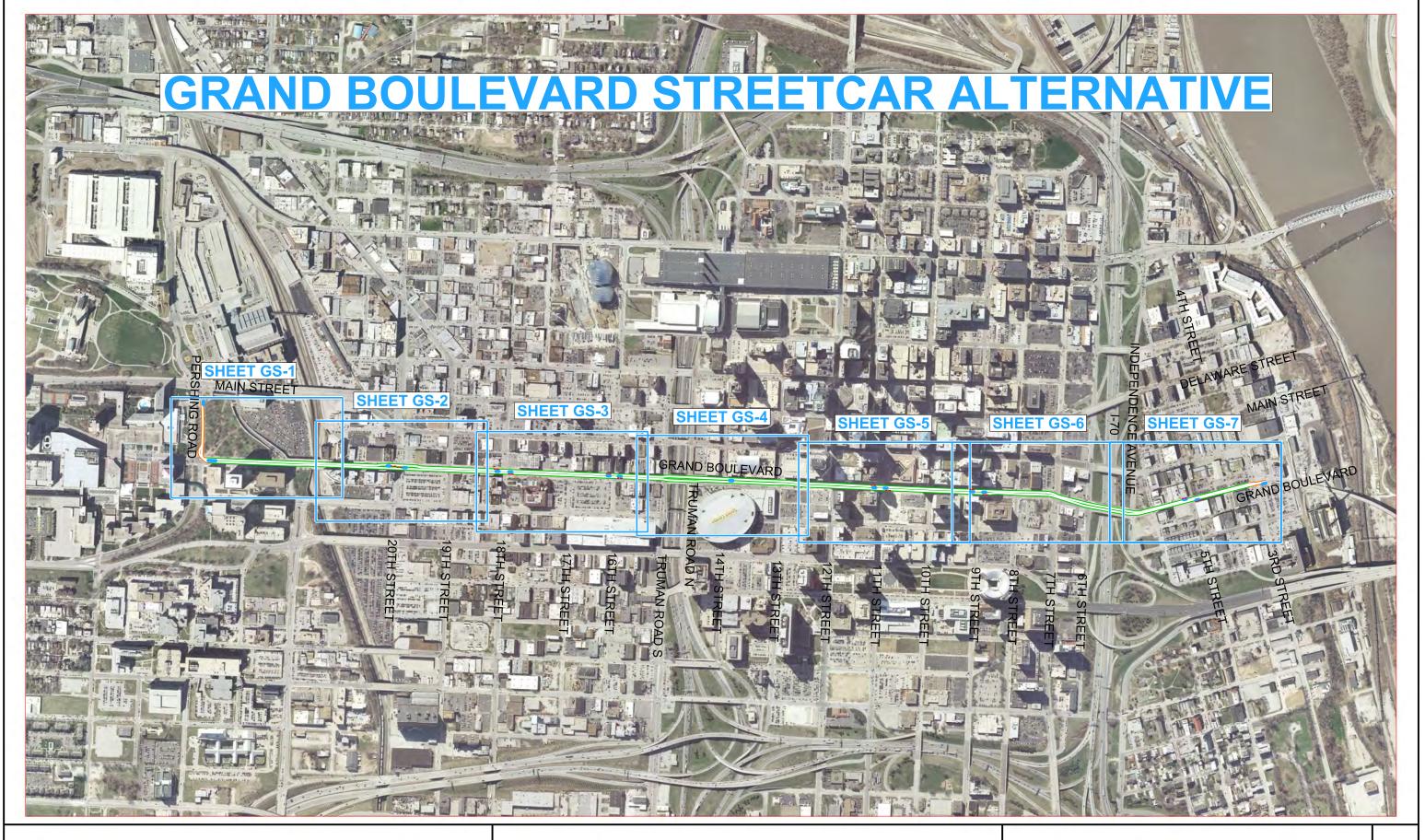
TYPICAL SECTION D-D. SEE SHEET MS-5.

















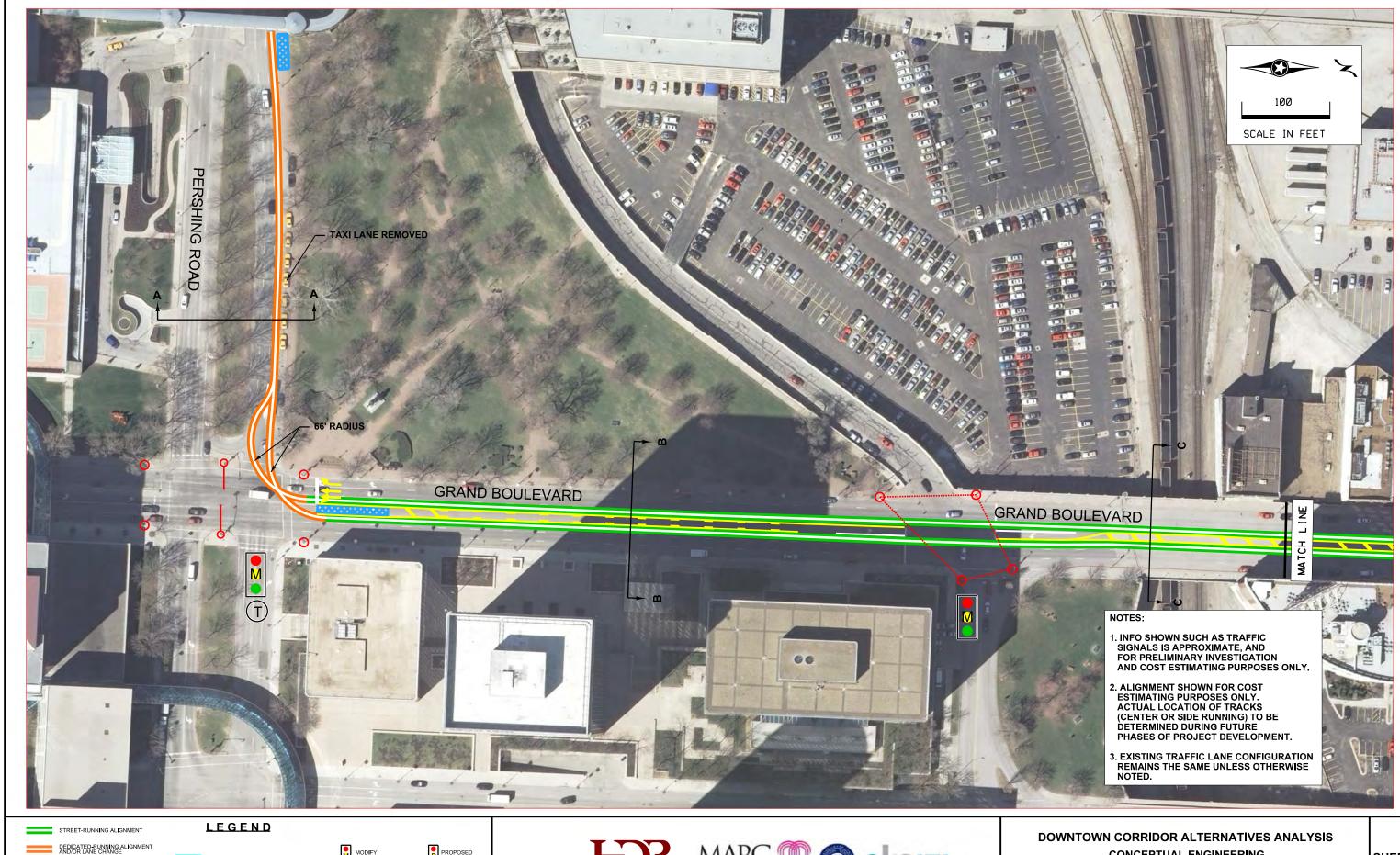




DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS

**CONCEPTUAL ENGINEERING** 

DETAILED STUDY AREA
GRAND BOULEVARD SEGMENT
STREETCAR LAYOUT SHEET INDEX



**CONCEPTUAL ENGINEERING** 

DETAILED STUDY AREA **GRAND BOULEVARD SEGMENT**  SHEET GS-1 OF

EXISTING TRAFFIC SIGNAL

EXISTING TRAFFIC SIGNAL AND MAST ARM

POTENTIAL STREETCAR STATION AREA

TRANSIT-ONLY PHASE REQUIRED

DIRECTION OF FLOW ARROWS

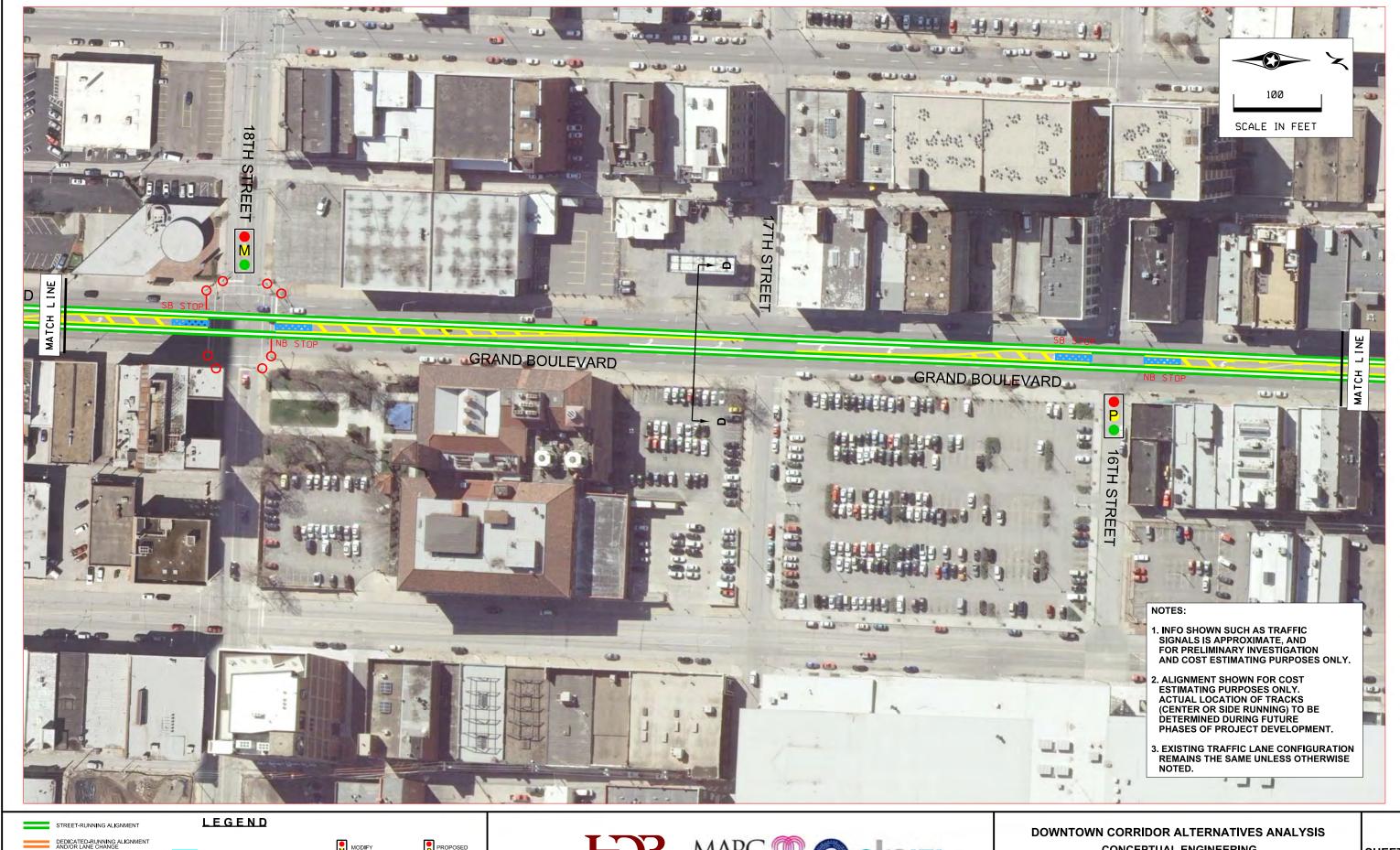


**GRAND BOULEVARD SEGMENT** 

OF

EXISTING TRAFFIC SIGNAL AND MAST ARM

TRANSIT-ONLY PHASE REQUIRED



\$FILEA\$

EXISTING TRAFFIC SIGNAL

EXISTING TRAFFIC SIGNAL AND MAST ARM

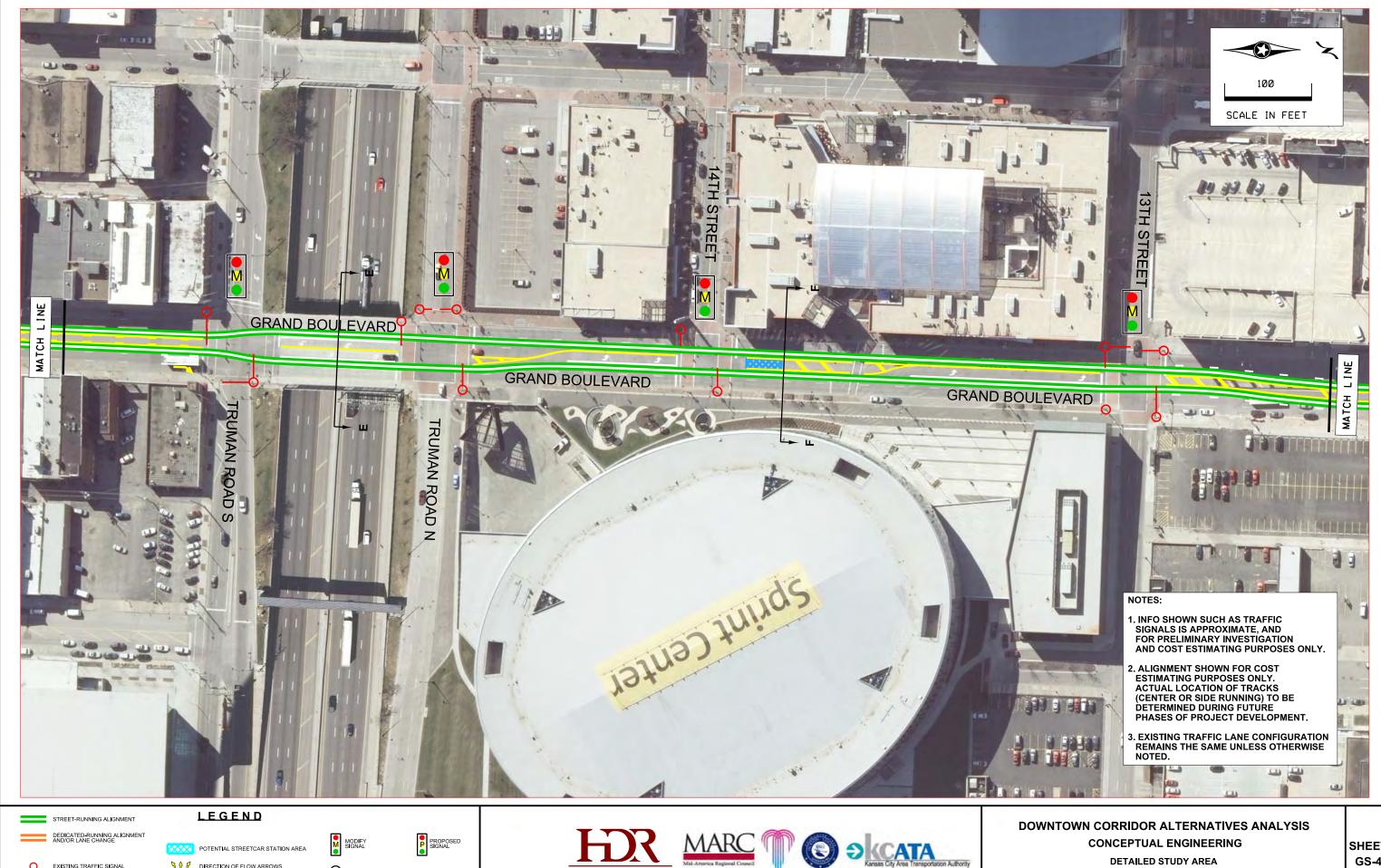
POTENTIAL STREETCAR STATION AREA

TRANSIT-ONLY PHASE REQUIRED

DIRECTION OF FLOW ARROWS

**DETAILED STUDY AREA GRAND BOULEVARD SEGMENT** 

SHEET GS-3 OF



**DETAILED STUDY AREA GRAND BOULEVARD SEGMENT** 

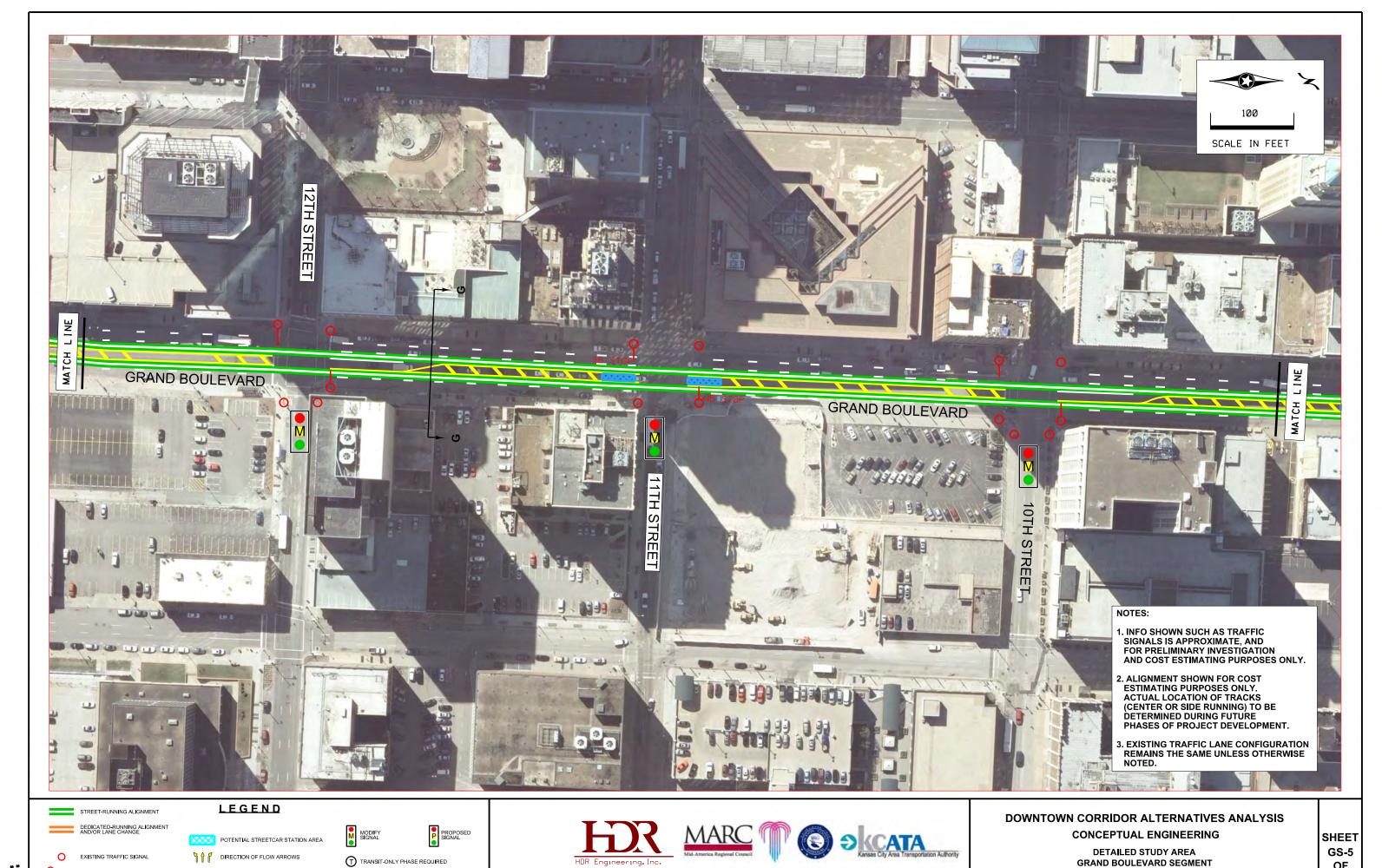
EXISTING TRAFFIC SIGNAL

EXISTING TRAFFIC SIGNAL AND MAST ARM

POTENTIAL STREETCAR STATION AREA

TRANSIT-ONLY PHASE REQUIRED

DIRECTION OF FLOW ARROWS



OF

EXISTING TRAFFIC SIGNAL AND MAST ARM





DEDICATED-RUNNING ALIGNMENT AND/OR LANE CHANGE

EXISTING TRAFFIC SIGNAL AND MAST ARM

EXISTING TRAFFIC SIGNAL

POTENTIAL STREETCAR STATION AREA

TRANSIT-ONLY PHASE REQUIRED

DIRECTION OF FLOW ARROWS

**DETAILED STUDY AREA GRAND BOULEVARD SEGMENT**  SHEET GS-6 OF



**CONCEPTUAL ENGINEERING** 

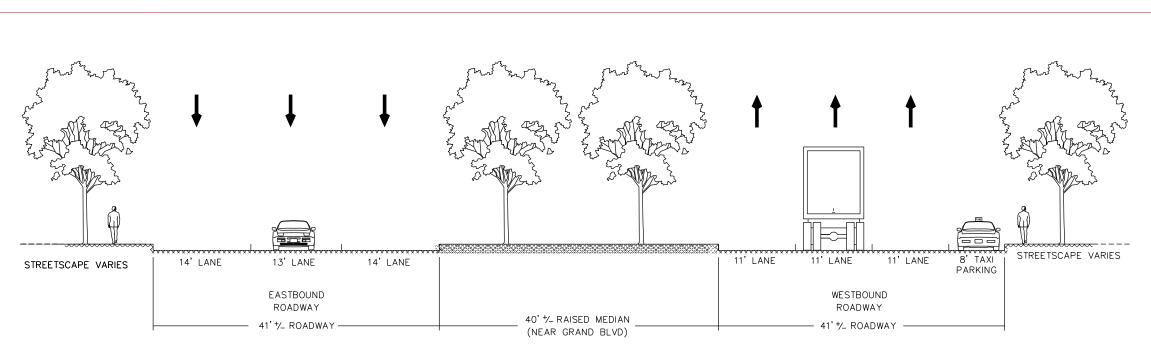
**DETAILED STUDY AREA GRAND BOULEVARD SEGMENT** 

EXISTING TRAFFIC SIGNAL

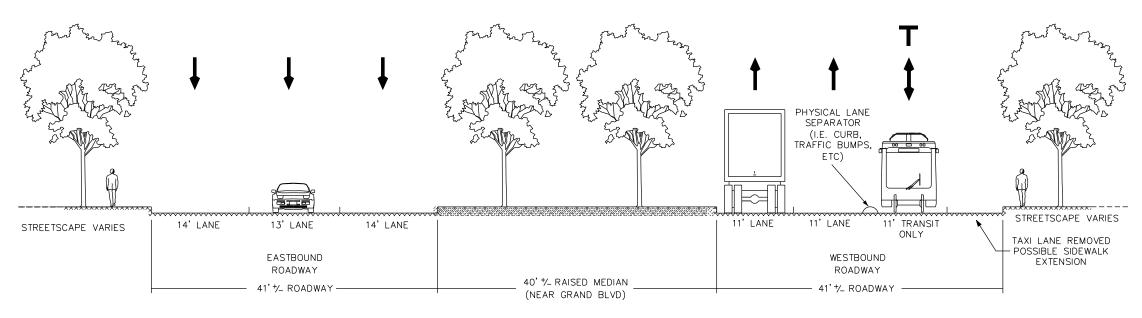
EXISTING TRAFFIC SIGNAL AND MAST ARM

DIRECTION OF FLOW ARROWS

TRANSIT-ONLY PHASE REQUIRED



#### EXISTING TYPICAL SECTION - PERSHING ROAD WEST OF GRAND BOULEVARD



PROPOSED TYPICAL SECTION - PERSHING ROAD WEST OF GRAND BOULEVARD

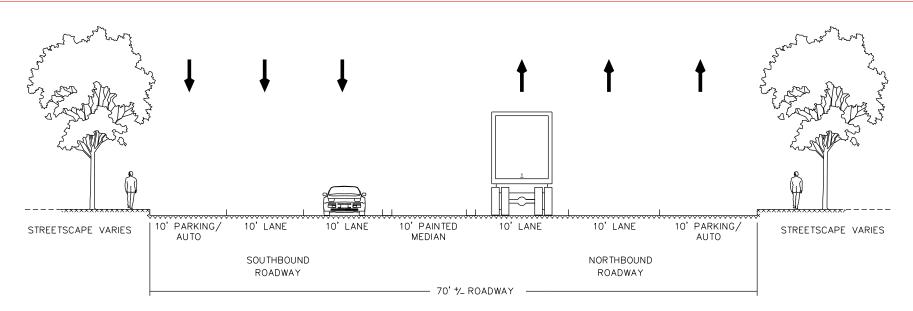
TYPICAL SECTION A-A. SEE SHEET GS-1.



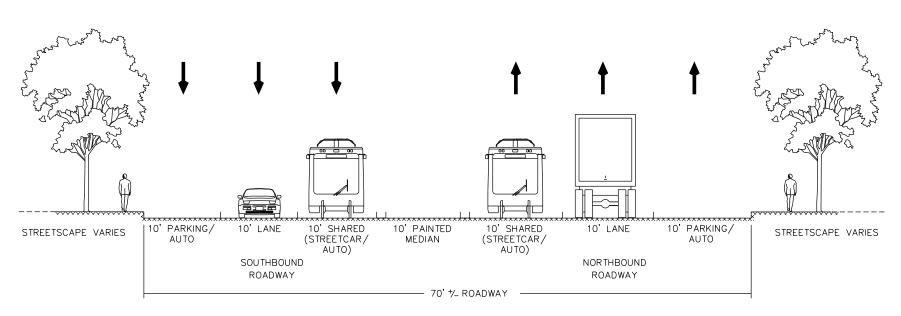








#### EXISTING TYPICAL SECTION - GRAND BOULEVARD BETWEEN PERSHING ROAD & RAILWAY BRIDGE



PROPOSED TYPICAL SECTION - GRAND BOULEVARD BETWEEN PERSHING ROAD & RAILWAY BRIDGE

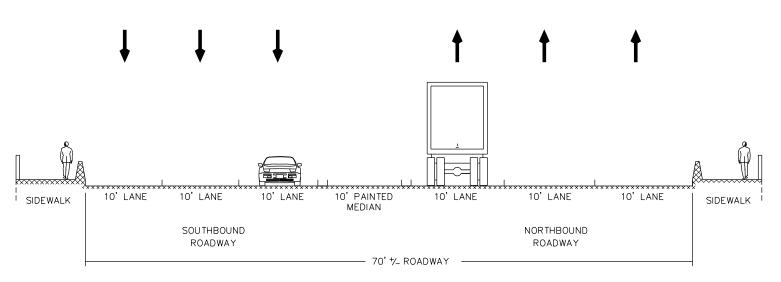
TYPICAL SECTION B-B. SEE SHEET GS-1.



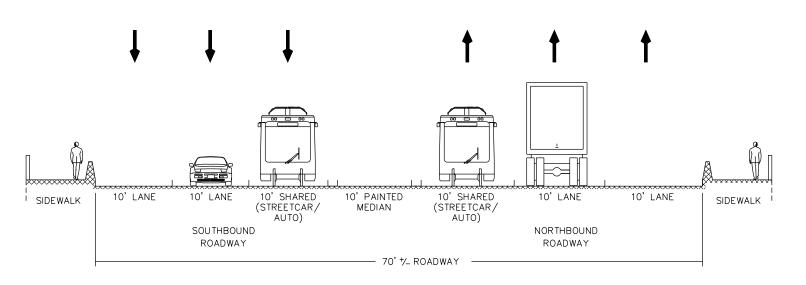








#### EXISTING TYPICAL SECTION - GRAND BOULEVARD ON BRIDGE OVER RAILWAY



PROPOSED TYPICAL SECTION - GRAND BOULEVARD ON BRIDGE OVER RAILWAY

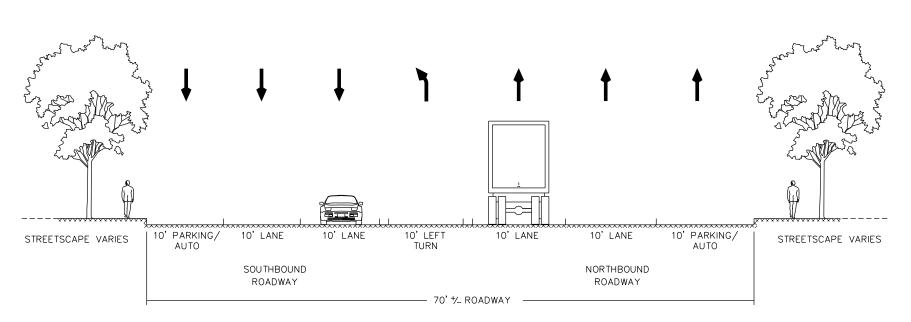
TYPICAL SECTION C-C. SEE SHEET GS-1.



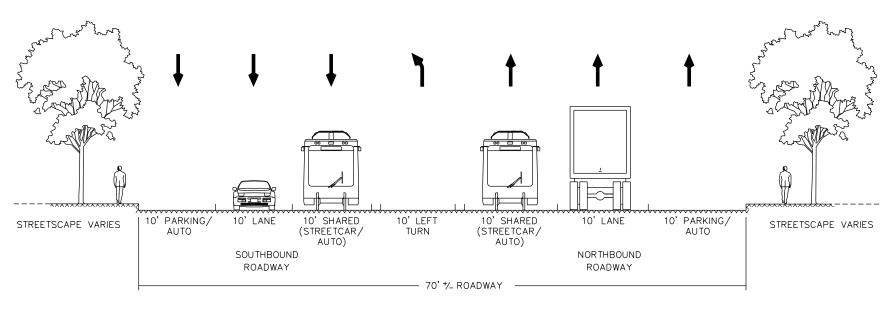








#### EXISTING TYPICAL SECTION - GRAND BOULEVARD BETWEEN RAILWAY BRIDGE & 1-670 BRIDGE



PROPOSED TYPICAL SECTION - GRAND BOULEVARD BETWEEN RAILWAY BRIDGE & I-670 BRIDGE

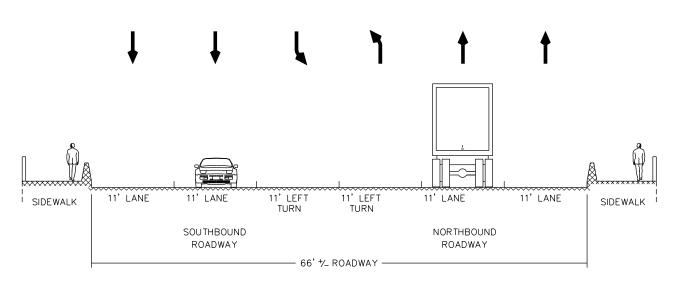
TYPICAL SECTION D-D. SEE SHEET GS-3.



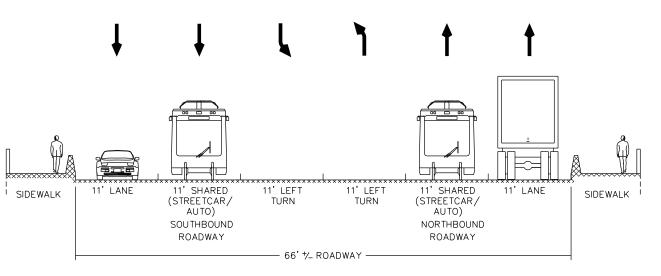








EXISTING TYPICAL SECTION - GRAND BOULEVARD ON BRIDGE OVER 1-670



PROPOSED TYPICAL SECTION - GRAND BOULEVARD ON BRIDGE OVER I-670

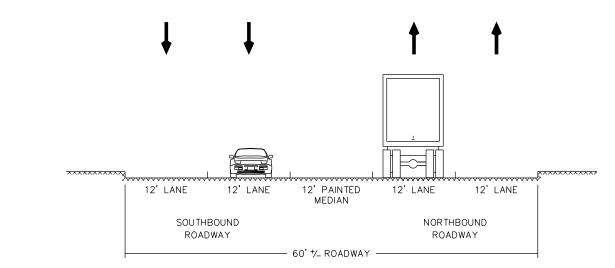
TYPICAL SECTION E-E. SEE SHEET GS-4.



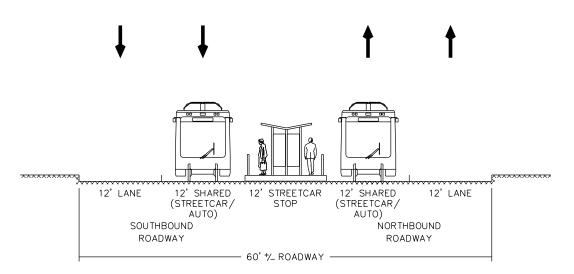








EXISTING TYPICAL SECTION - GRAND BOULEVARD BETWEEN I-670 BRIDGE & 13TH STREET



PROPOSED TYPICAL SECTION - GRAND BOULEVARD BETWEEN I-670 BRIDGE & 13TH STREET

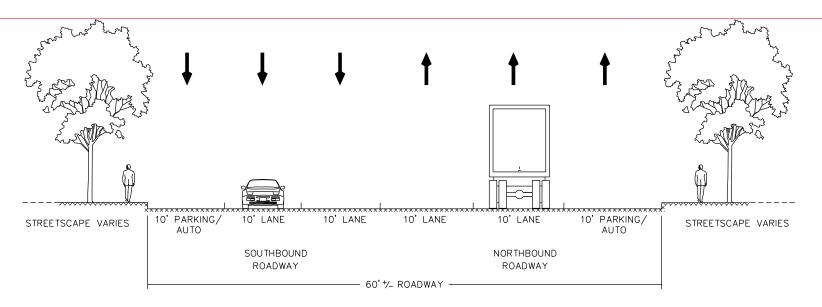
TYPICAL SECTION F-F. SEE SHEET GS-4.



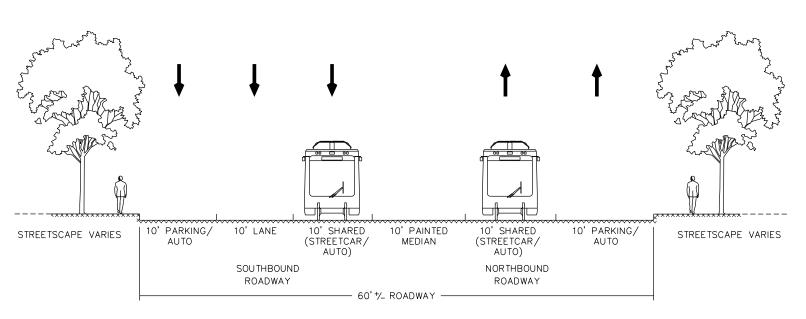








#### EXISTING TYPICAL SECTION - GRAND BOULEVARD BETWEEN 13TH STREET & I-70 BRIDGE



PROPOSED TYPICAL SECTION - GRAND BOULEVARD BETWEEN 13TH STREET & I-70 BRIDGE

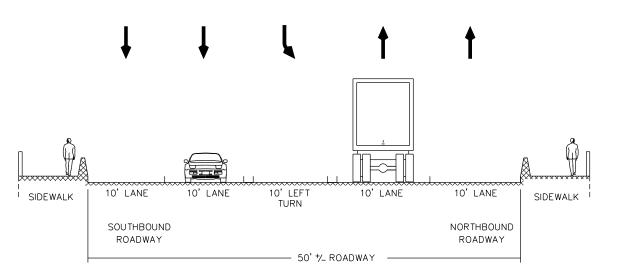
TYPICAL SECTION G-G. SEE SHEET GS-5.



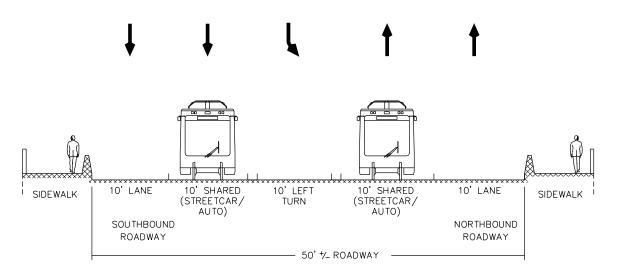








EXISTING TYPICAL SECTION - GRAND BOULEVARD ON BRIDGE OVER 1-70



PROPOSED TYPICAL SECTION - GRAND BOULEVARD ON BRIDGE OVER I-70

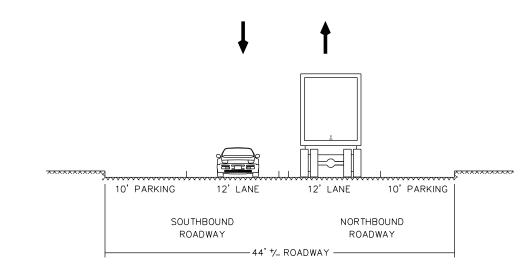
TYPICAL SECTION H-H. SEE SHEET GS-6.



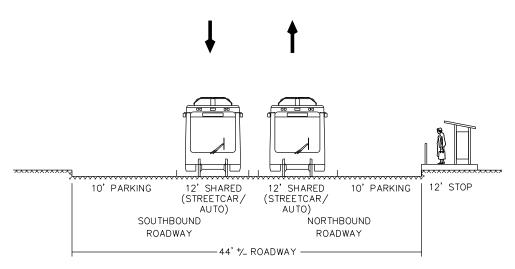








EXISTING TYPICAL SECTION - GRAND BOULEVARD BETWEEN I-70 BRIDGE & 3RD STREET



PROPOSED TYPICAL SECTION - GRAND BOULEVARD BETWEEN I-70 BRIDGE & 3RD STREET

TYPICAL SECTION I-I. SEE SHEET GS-7.







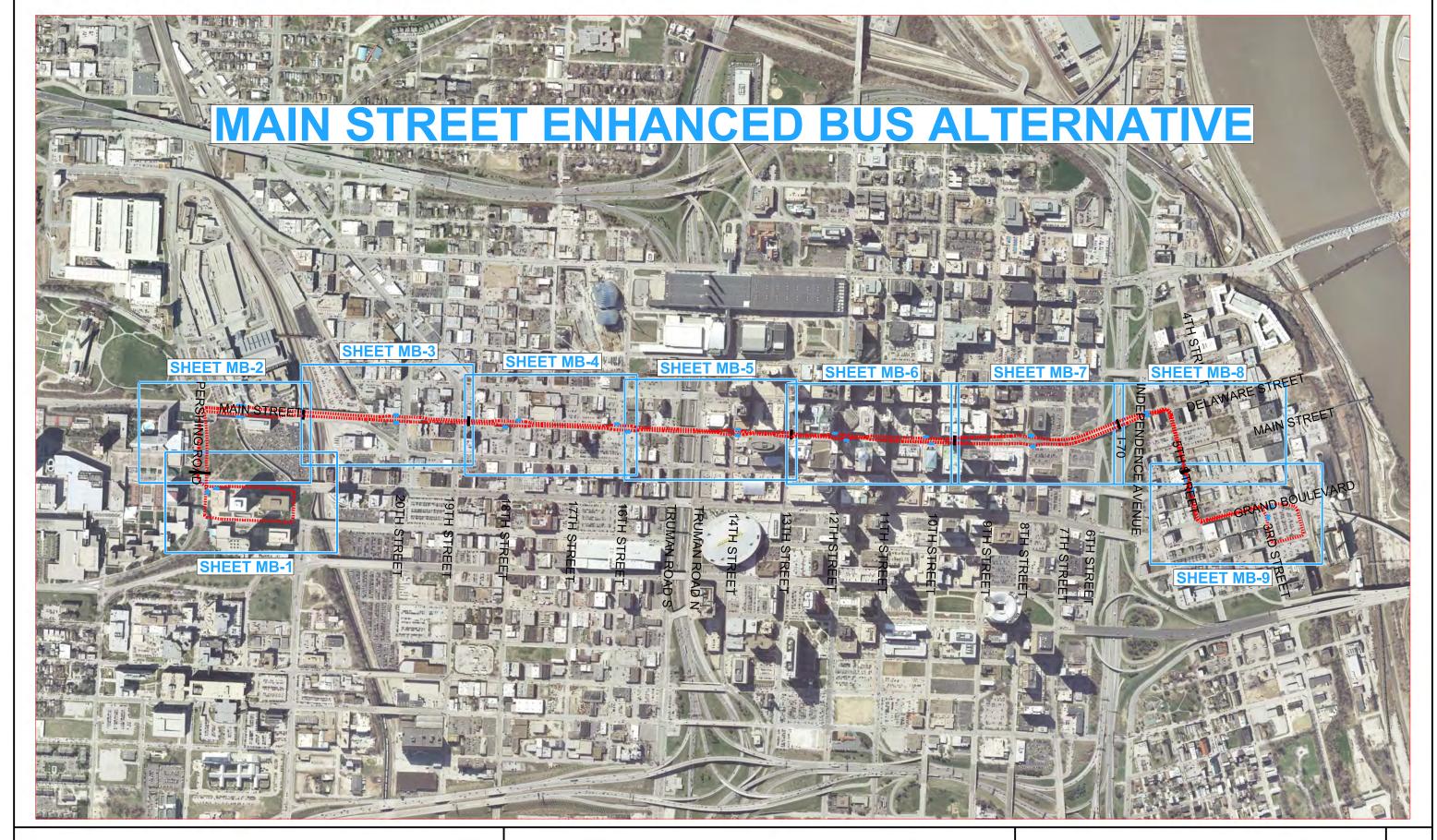


# **Downtown Corridor Alternatives Analysis**



## **ENHANCED BUS ALTERNATIVES**









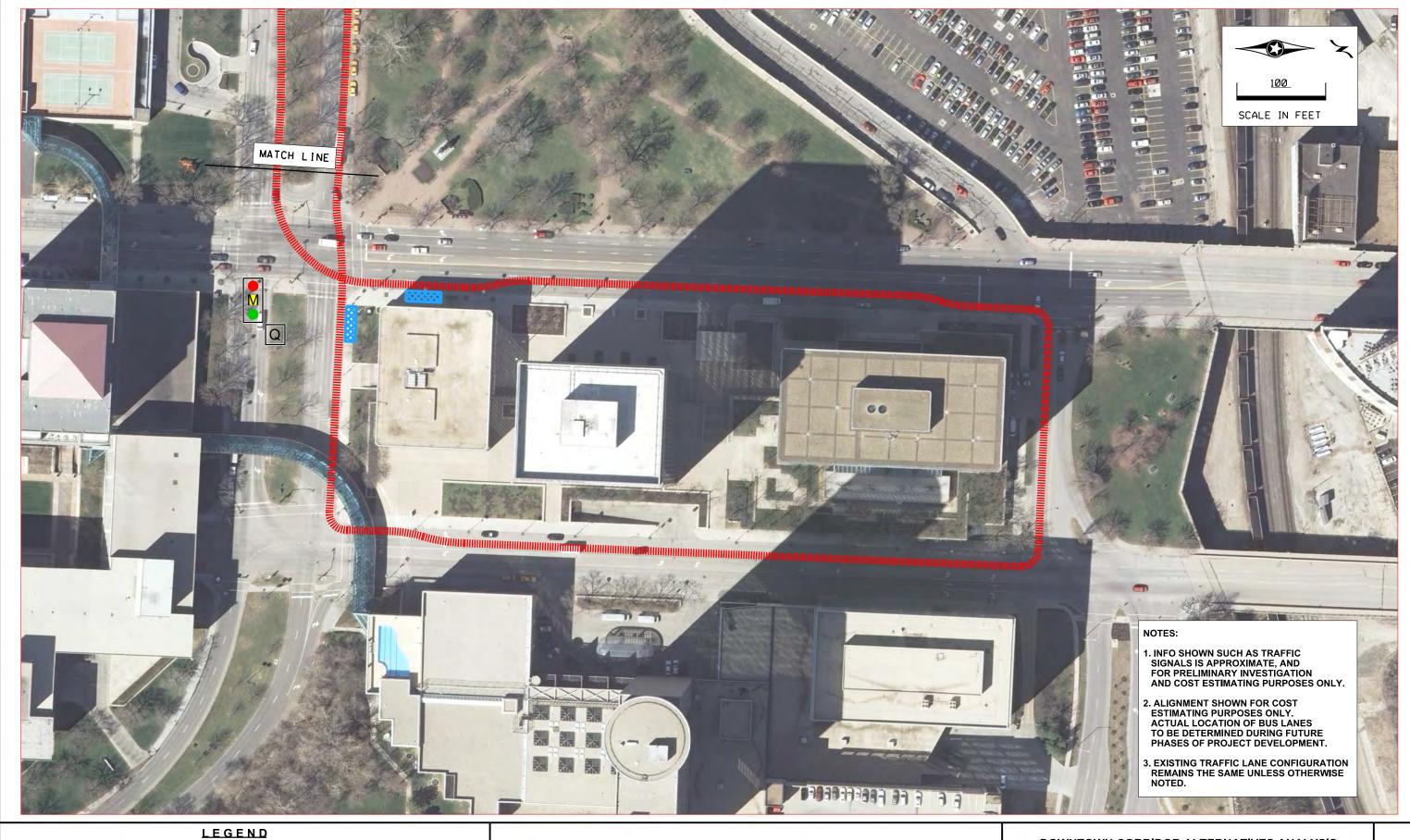




DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS

CONCEPTUAL ENGINEERING

DETAILED STUDY AREA
MAIN STREET SEGMENT
ENHANCED BUS LAYOUT SHEET INDEX



EXISTING TRAFFIC SIGNAL AND MAST ARM

STREET-RUNNING BUS ALIGNMENT



Q QUEUE JUMP - LANE ONLY









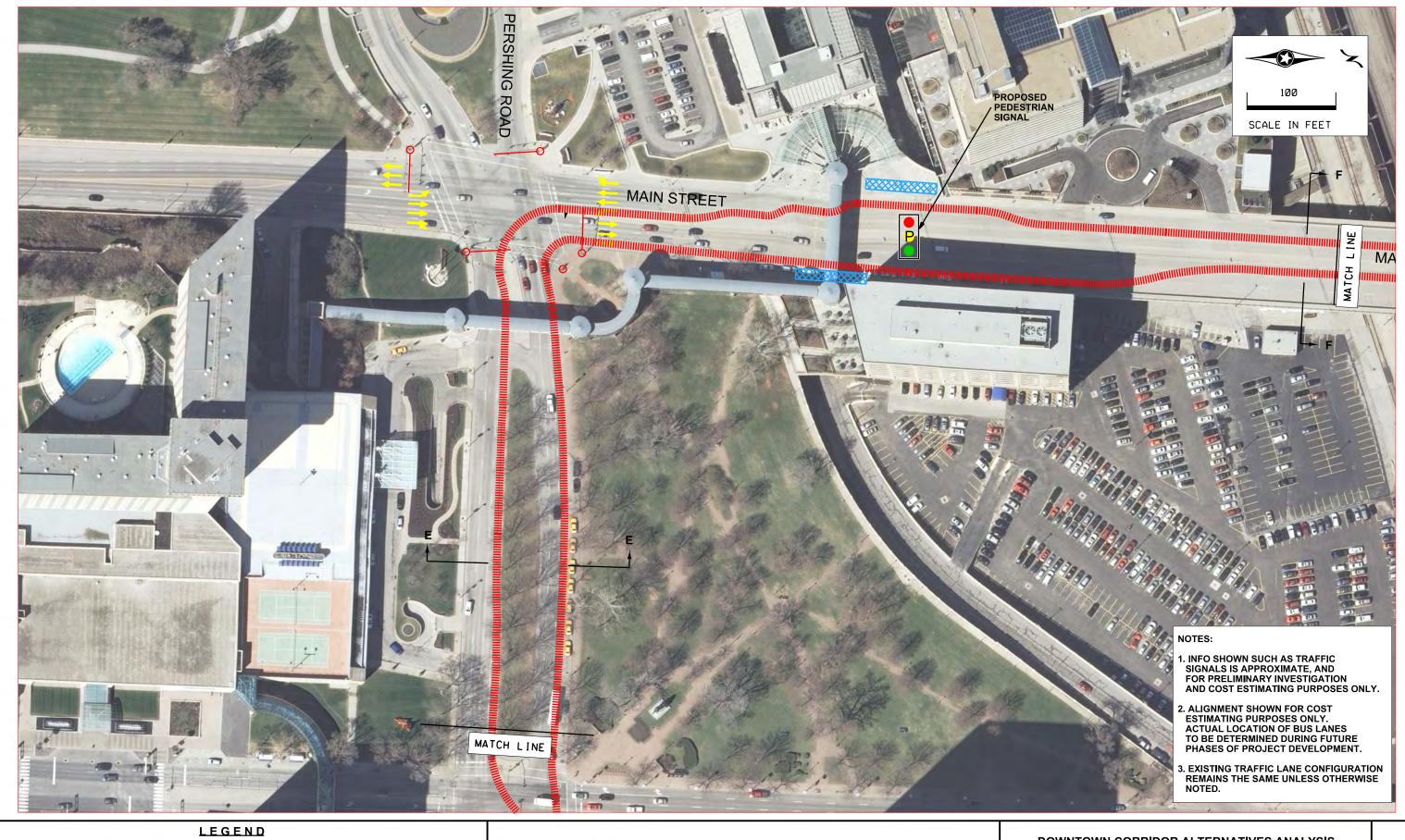




#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

DETAILED STUDY AREA MAIN STREET SEGMENT **BUS ALTERNATIVE** 

SHEET MB-1 OF MB-13



EXISTING TRAFFIC SIGNAL AND MAST ARM



















#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

**DETAILED STUDY AREA** MAIN STREET SEGMENT **BUS ALTERNATIVE** 

SHEET MB-2 OF **MB-13** 



EXISTING TRAFFIC SIGNAL AND MAST ARM







Q QUEUE JUMP - LANE + TRANSIT-ONLY PHASE











#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

DETAILED STUDY AREA MAIN STREET SEGMENT **BUS ALTERNATIVE** 

SHEET MB-3 OF MB-13



EXISTING TRAFFIC SIGNAL AND MAST ARM





Q QUEUE JUMP - LANE + TRANSIT-ONLY PHASE





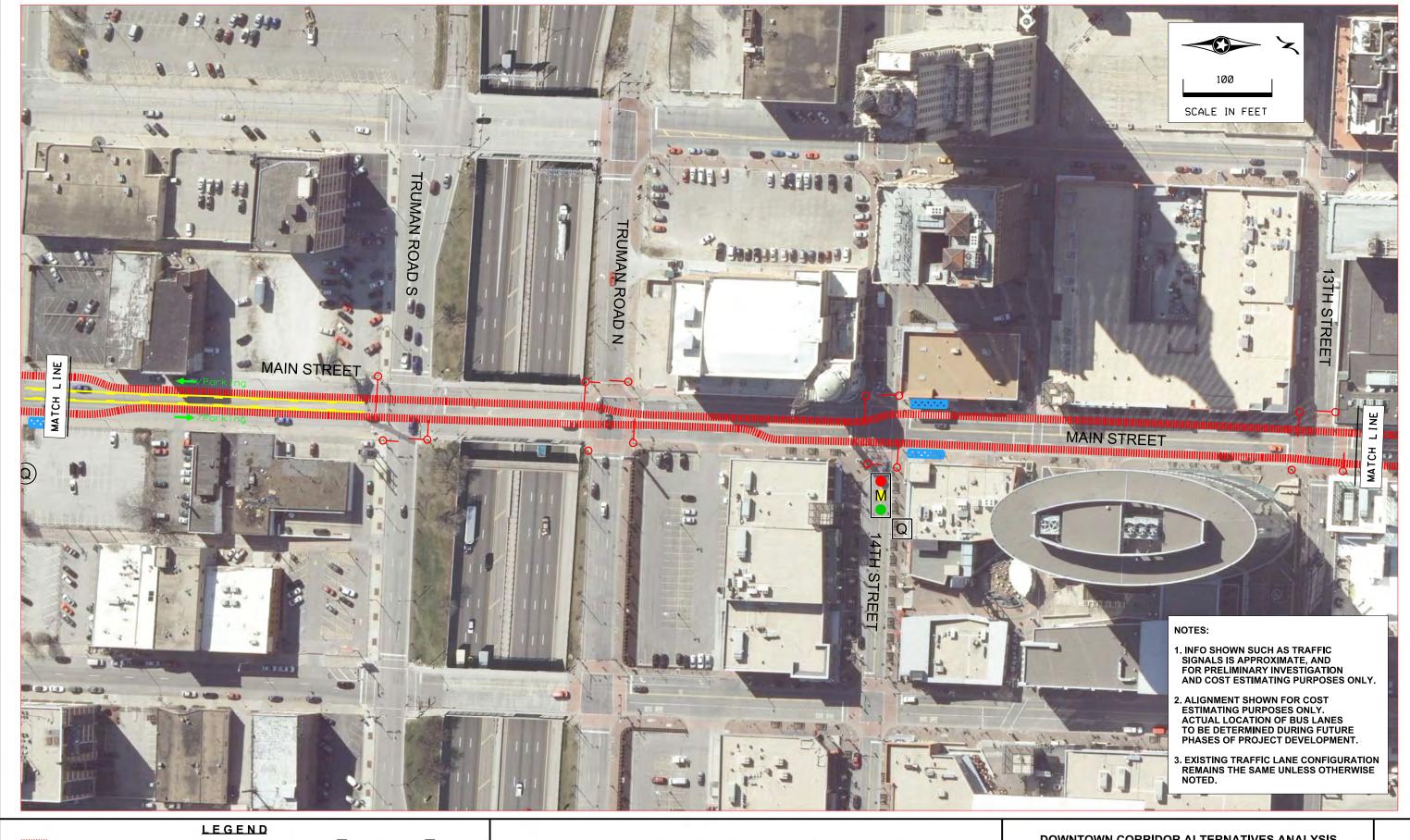






#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

**DETAILED STUDY AREA** MAIN STREET SEGMENT **BUS ALTERNATIVE** 



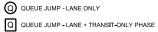
EXISTING TRAFFIC SIGNAL AND MAST ARM

POTENTIAL BUS STATION AREA DIRECTION OF FLOW ARROWS













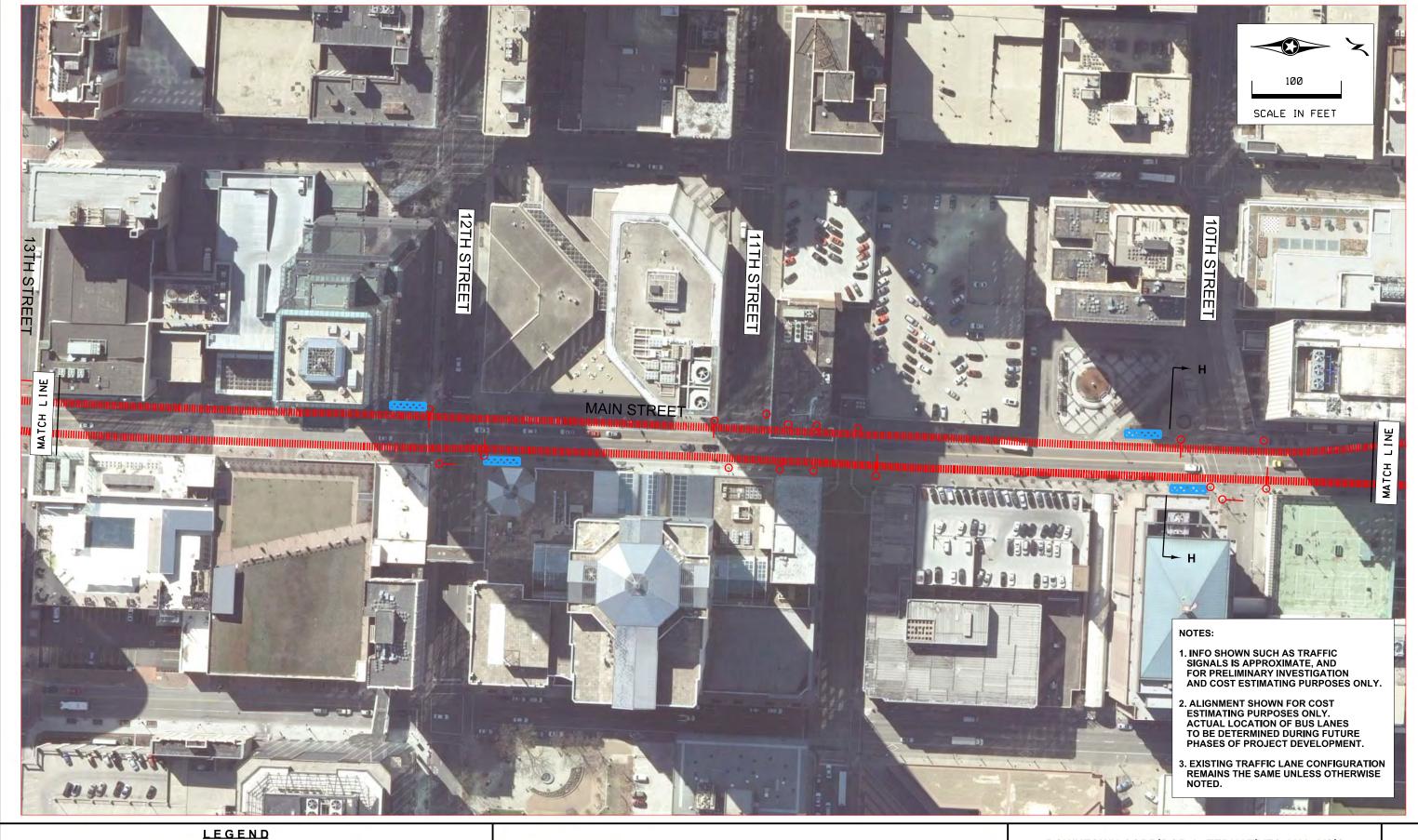




#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

DETAILED STUDY AREA MAIN STREET SEGMENT **BUS ALTERNATIVE** 

SHEET MB-5 OF MB-13



EXISTING TRAFFIC SIGNAL AND MAST ARM















#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

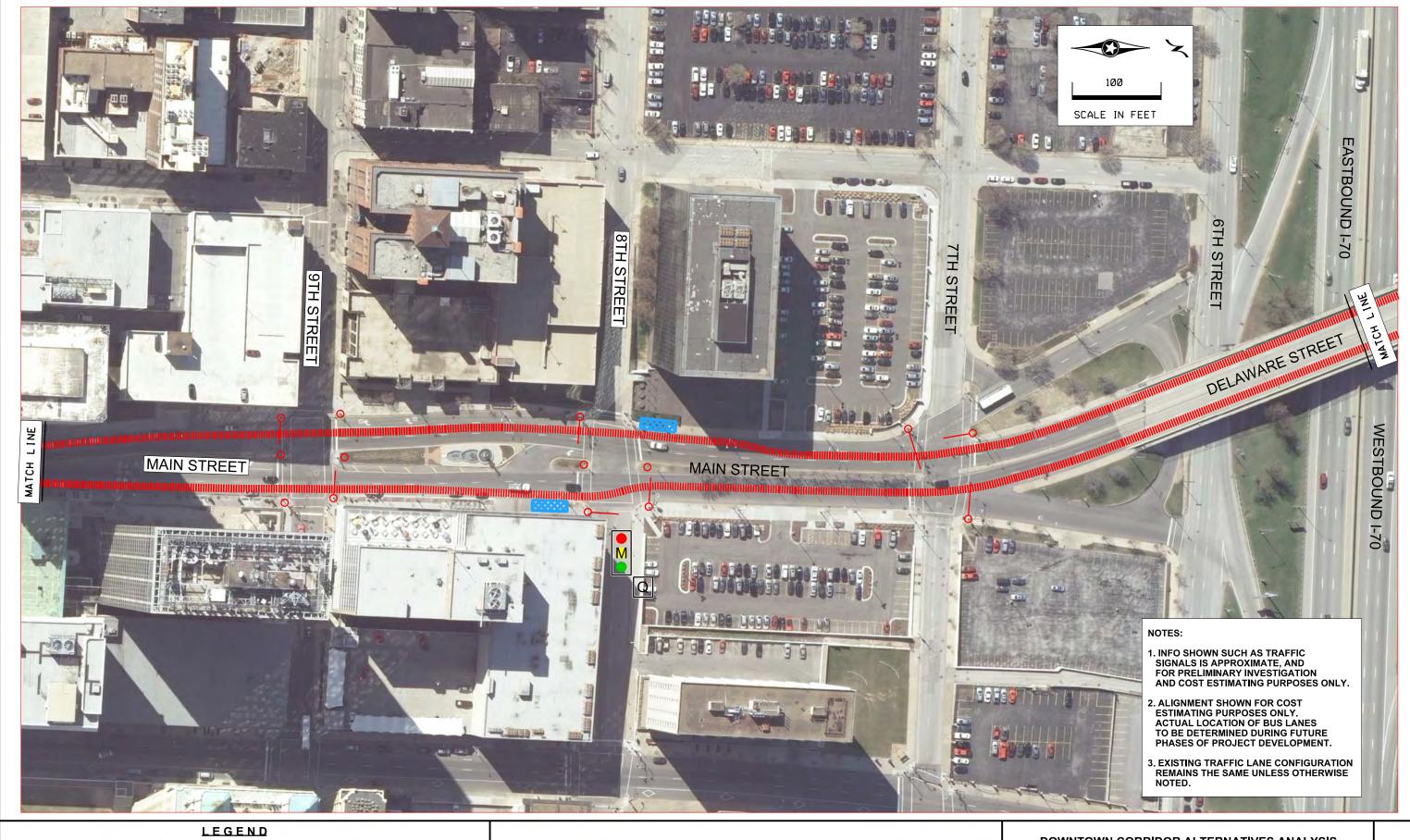
DETAILED STUDY AREA MAIN STREET SEGMENT **BUS ALTERNATIVE** 

SHEET

MB-6

OF

MB-13



STREET-RUNNING BUS ALIGNMENT

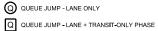
EXISTING TRAFFIC SIGNAL AND MAST ARM

POTENTIAL BUS STATION AREA DIRECTION OF FLOW ARROWS

















#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

**DETAILED STUDY AREA** MAIN STREET SEGMENT **BUS ALTERNATIVE** 



EXISTING TRAFFIC SIGNAL AND MAST ARM

STREET-RUNNING BUS ALIGNMENT



The properties of the properti















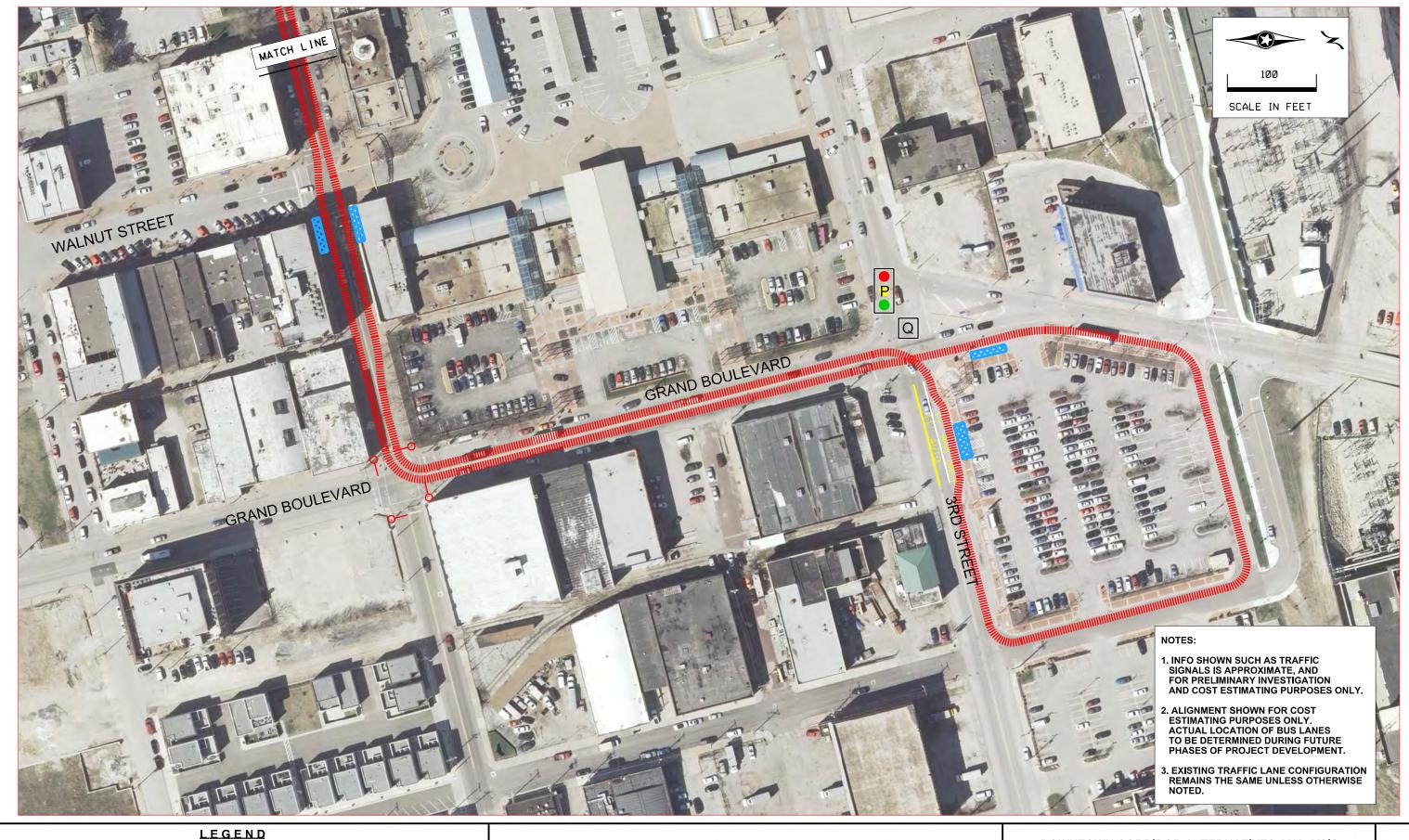




#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

**DETAILED STUDY AREA** MAIN STREET SEGMENT **BUS ALTERNATIVE** 

SHEET MB-8 OF **MB-13** 



TIMES DATES 0—

EXISTING TRAFFIC SIGNAL AND MAST ARM

STREET-RUNNING BUS ALIGNMENT

POTENTIAL BUS STATION AREA

POTENTIAL BUS STATION AREA

DIRECTION OF FLOW ARROWS

MODIFY SIGNAL
ADD SIGNAL/PHASE
FOR QUEUE JUMP

Q QUEUE JUMP - LANE ONLY



Q QUEUE JUMP - LANE + TRANSIT-ONLY PHASE







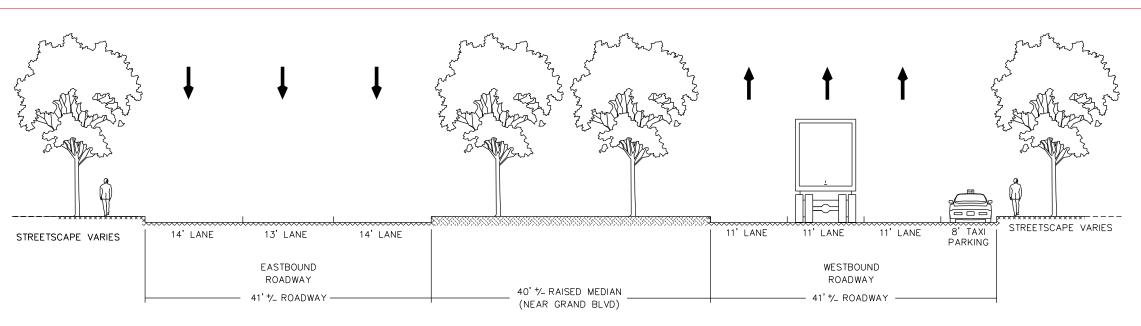




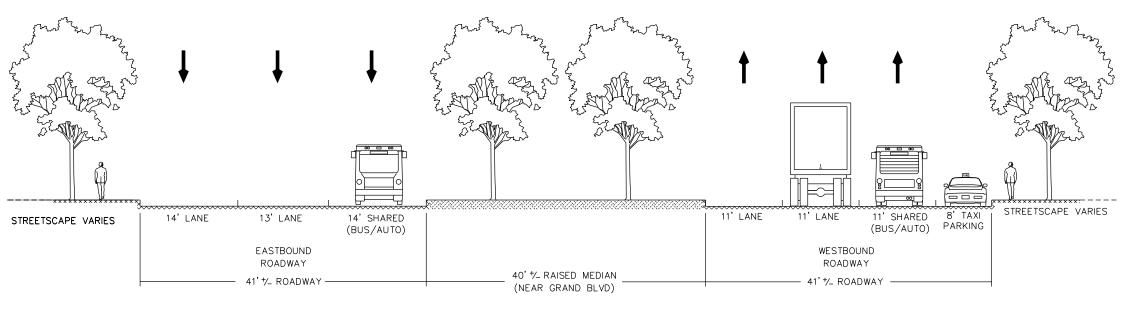
# DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING

DETAILED STUDY AREA MAIN STREET SEGMENT BUS ALTERNATIVE

SHEET MB-9 OF MB-13



#### EXISTING TYPICAL SECTION - PERSHING ROAD WEST OF GRAND BOULEVARD



PROPOSED TYPICAL SECTION - PERSHING ROAD WEST OF GRAND BOULEVARD

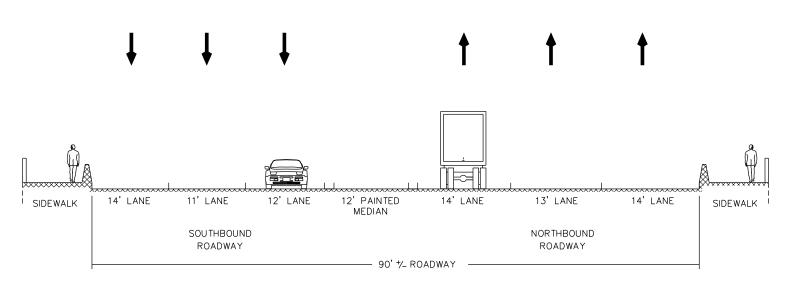
TYPICAL SECTION E-E. SEE SHEET MB-2.



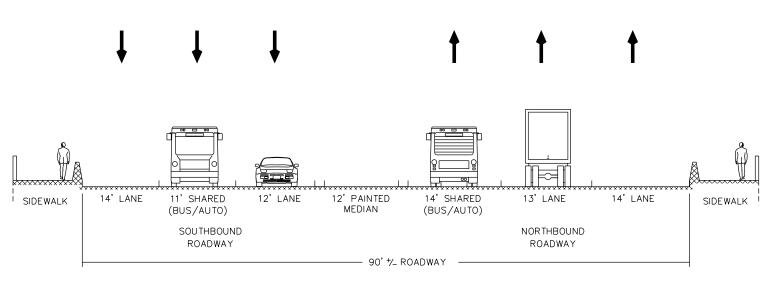








#### EXISTING TYPICAL SECTION - MAIN STREET ON BRIDGE OVER RAILWAY



PROPOSED TYPICAL SECTION - MAIN STREET ON BRIDGE OVER RAILWAY

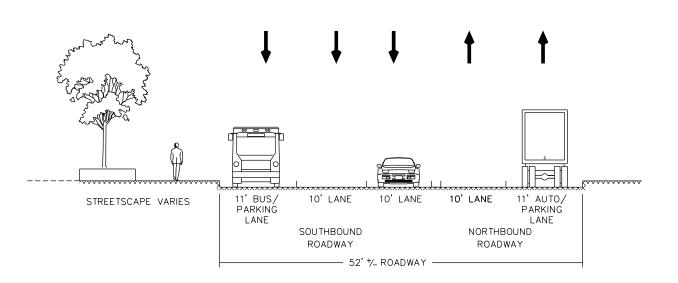
TYPICAL SECTION F-F. SEE SHEET MB-2.



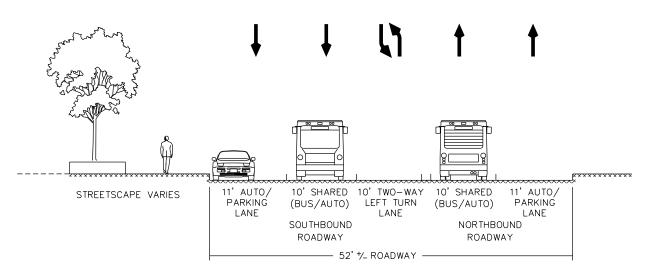








#### EXISTING TYPICAL SECTION - MAIN STREET SOUTH OF 17TH STREET



#### PROPOSED TYPICAL SECTION - MAIN STREET SOUTH OF 17TH STREET

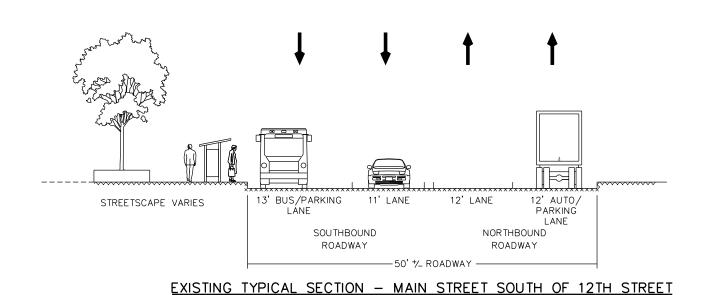
TYPICAL SECTION G-G. SEE SHEET MB-4.

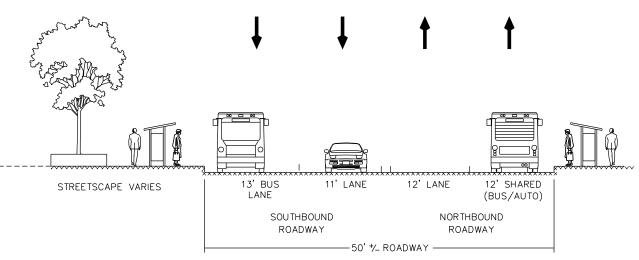












PROPOSED TYPICAL SECTION - MAIN STREET SOUTH OF 12TH STREET

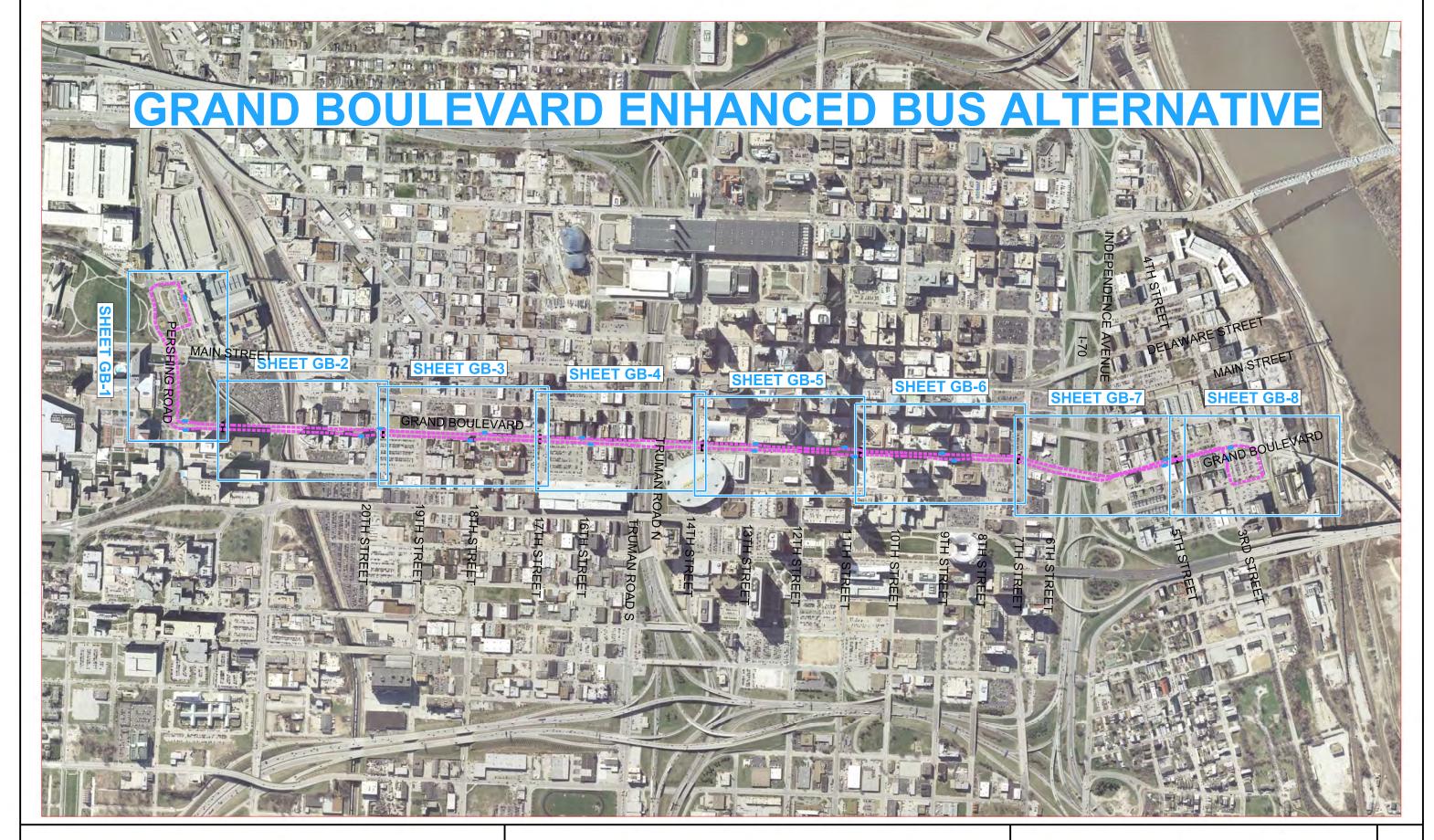
TYPICAL SECTION H-H. SEE SHEET MB-6.















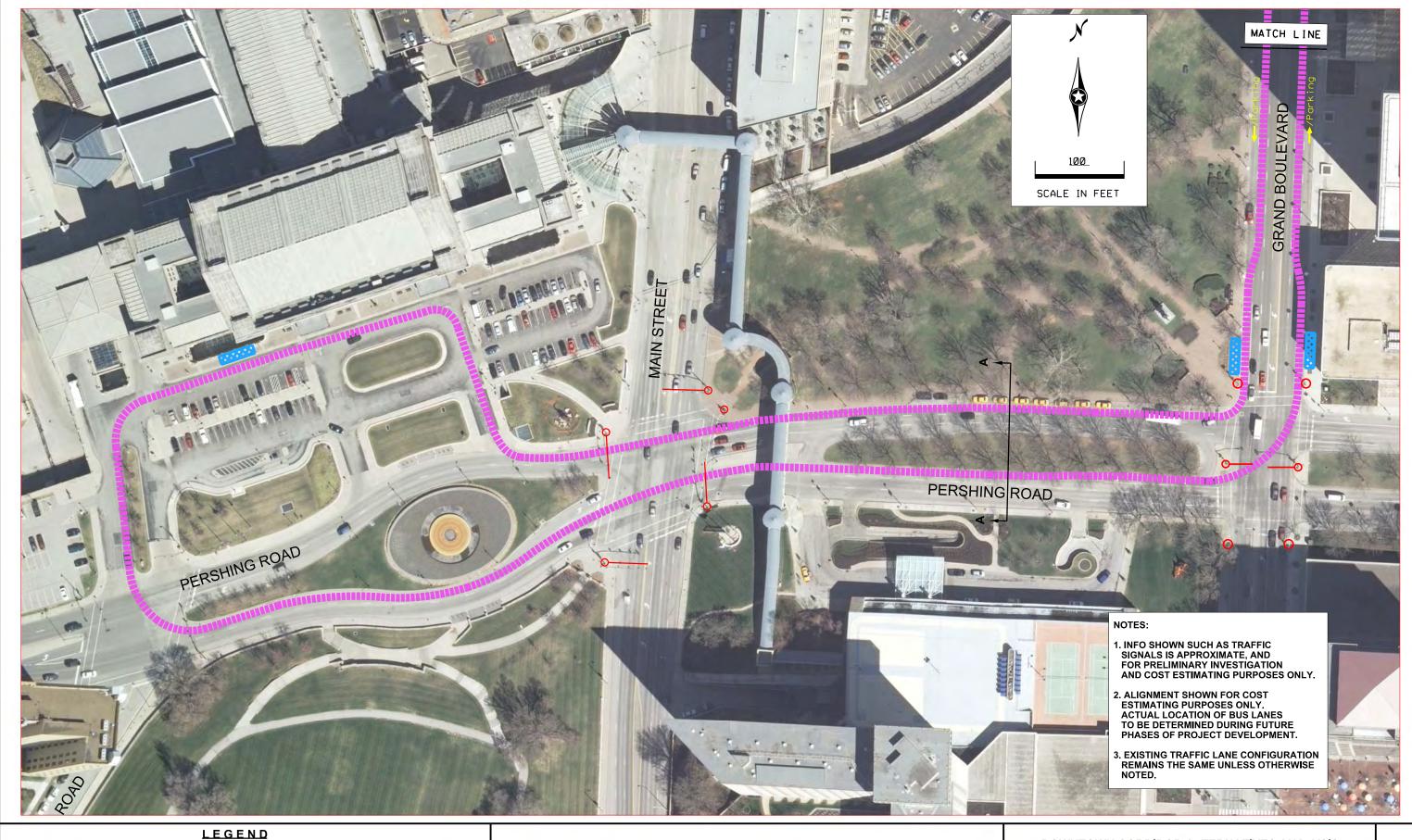




DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS

**CONCEPTUAL ENGINEERING** 

DETAILED STUDY AREA
GRAND BOULEVARD SEGMENT
ENHANCED BUS LAYOUT SHEET INDEX



STREET-RUNNING BUS ALIGNMENT

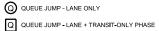
EXISTING TRAFFIC SIGNAL

















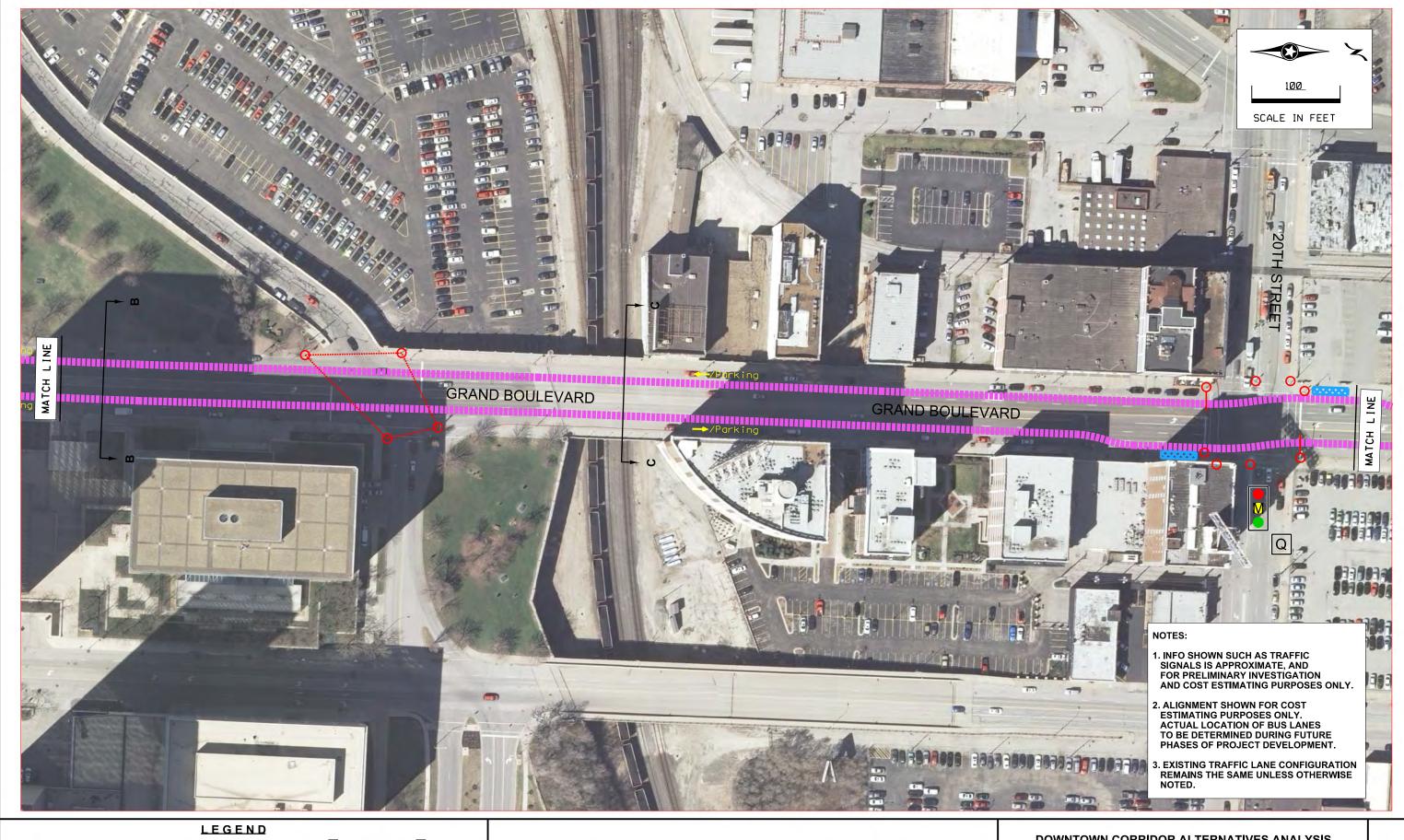


#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

DETAILED STUDY AREA GRAND BOULEVARD SEGMENT **BUS ALTERNATIVE** 

SHEET

GB-1



EXISTING TRAFFIC SIGNAL

STREET-RUNNING BUS ALIGNMENT

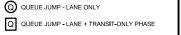
EXISTING TRAFFIC SIGNAL AND MAST ARM

POTENTIAL BUS STATION AREA The properties of the properti

















#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

DETAILED STUDY AREA GRAND BOULEVARD SEGMENT **BUS ALTERNATIVE** 

SHEET GB-2 OF



EXISTING TRAFFIC SIGNAL AND MAST ARM

STREET-RUNNING BUS ALIGNMENT

EXISTING TRAFFIC SIGNAL

POTENTIAL BUS STATION AREA Q QUEUE JUMP - LANE ONLY

The properties of the properti



Q QUEUE JUMP - LANE + TRANSIT-ONLY PHASE













#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

**DETAILED STUDY AREA GRAND BOULEVARD SEGMENT BUS ALTERNATIVE** 

SHEET GB-3 OF



STREET-RUNNING BUS ALIGNMENT EXISTING TRAFFIC SIGNAL





Q QUEUE JUMP - LANE + TRANSIT-ONLY PHASE













#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

GRAND BOULEVARD SEGMENT **BUS ALTERNATIVE** 

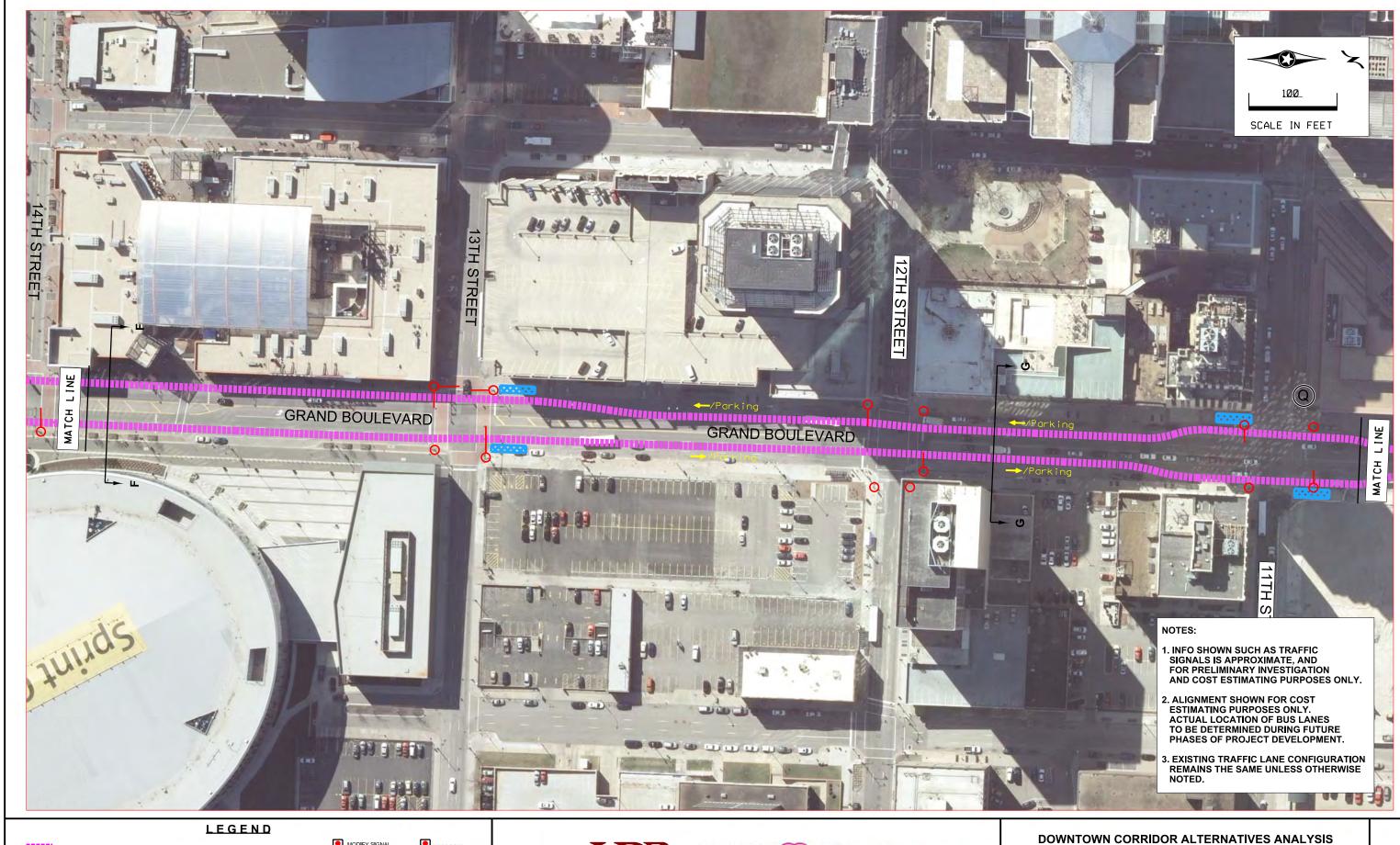
**DETAILED STUDY AREA** 

SHEET

GB-4

OF

**GB-17** 



EXISTING TRAFFIC SIGNAL AND MAST ARM

STREET-RUNNING BUS ALIGNMENT

EXISTING TRAFFIC SIGNAL

POTENTIAL BUS STATION AREA The properties of the properti







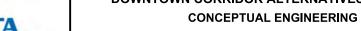
Q QUEUE JUMP - LANE + TRANSIT-ONLY PHASE





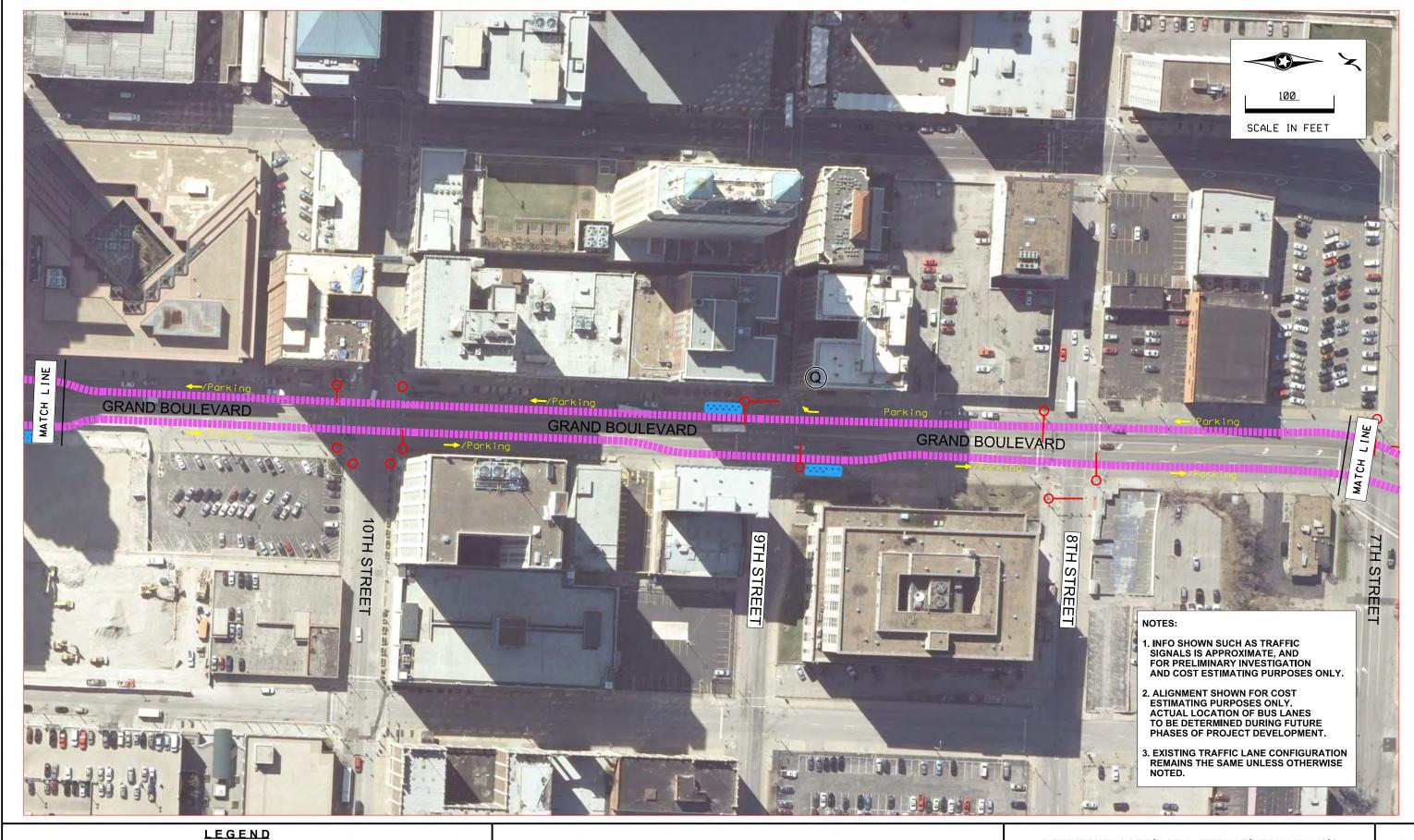






**DETAILED STUDY AREA GRAND BOULEVARD SEGMENT** 

**BUS ALTERNATIVE** 



STREET-RUNNING BUS ALIGNMENT

EXISTING TRAFFIC SIGNAL AND MAST ARM

EXISTING TRAFFIC SIGNAL



POTENTIAL BUS STATION AREA







Q QUEUE JUMP - LANE + TRANSIT-ONLY PHASE









#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

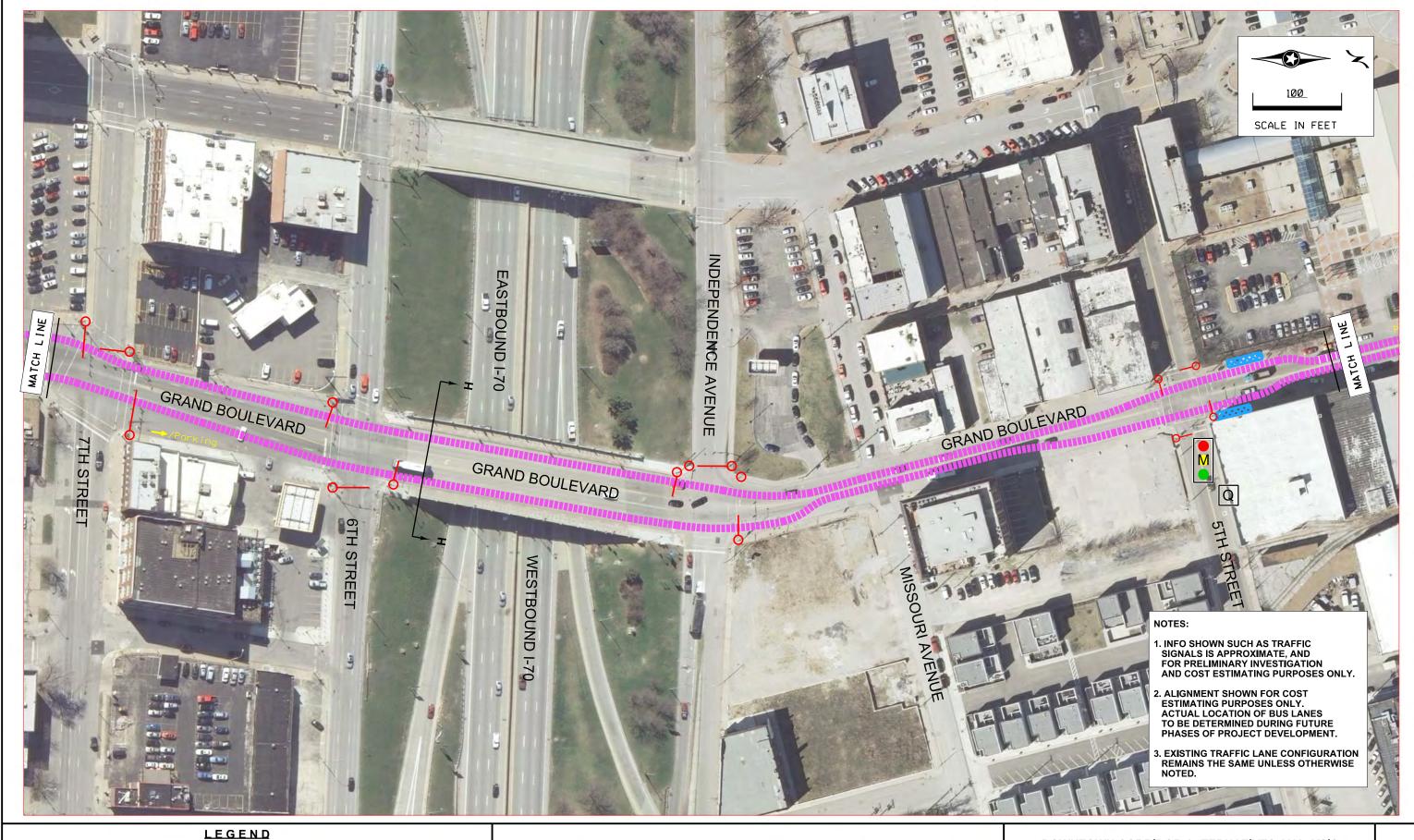
DETAILED STUDY AREA GRAND BOULEVARD SEGMENT **BUS ALTERNATIVE** 

SHEET

GB-6

OF

**GB-17** 



STREET-RUNNING BUS ALIGNMENT

EXISTING TRAFFIC SIGNAL

EXISTING TRAFFIC SIGNAL AND MAST ARM

POTENTIAL BUS STATION AREA The properties of the properti

















#### **DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING**

DETAILED STUDY AREA GRAND BOULEVARD SEGMENT **BUS ALTERNATIVE** 

SHEET

GB-7

OF

**GB-17** 



FTIMES FDATES 0—

EXISTING TRAFFIC SIGNAL AND MAST ARM

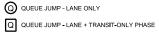
STREET-RUNNING BUS ALIGNMENT

EXISTING TRAFFIC SIGNAL

POTENTIAL BUS STATION AREA









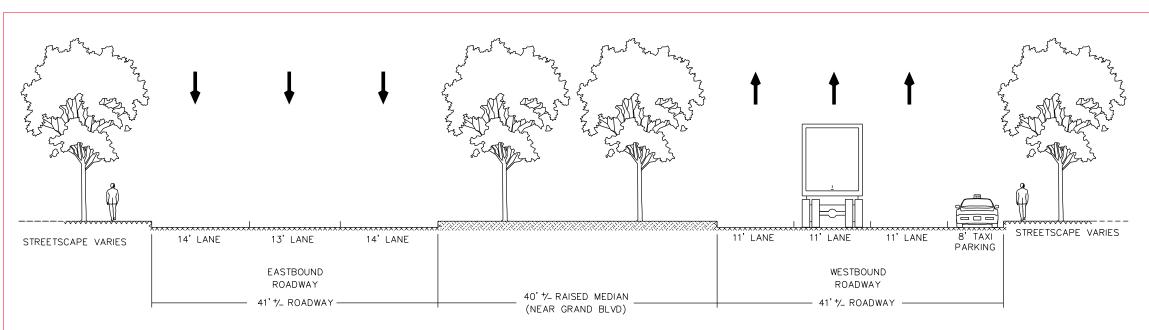




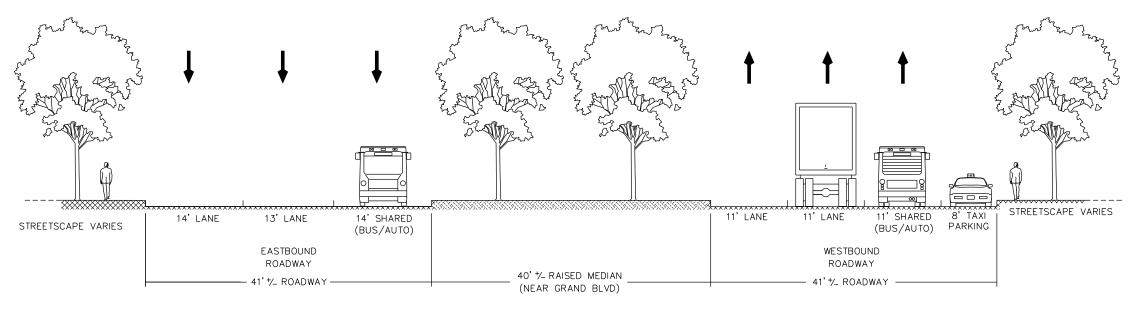


# DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS CONCEPTUAL ENGINEERING

DETAILED STUDY AREA GRAND BOULEVARD SEGMENT BUS ALTERNATIVE



#### EXISTING TYPICAL SECTION - PERSHING ROAD WEST OF GRAND BOULEVARD



#### PROPOSED TYPICAL SECTION - PERSHING ROAD WEST OF GRAND BOULEVARD

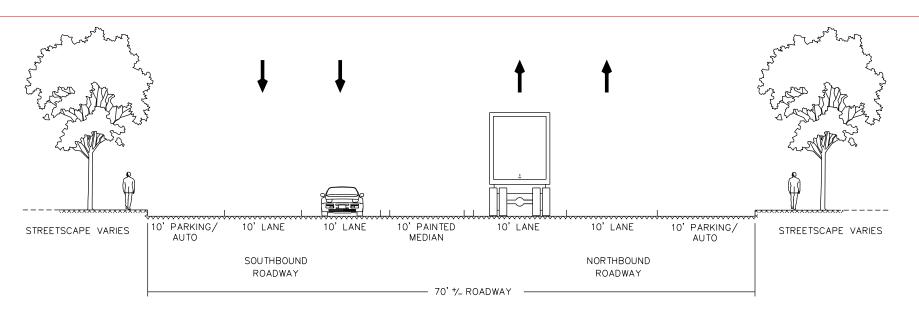
TYPICAL SECTION A-A. SEE SHEET GB-1.



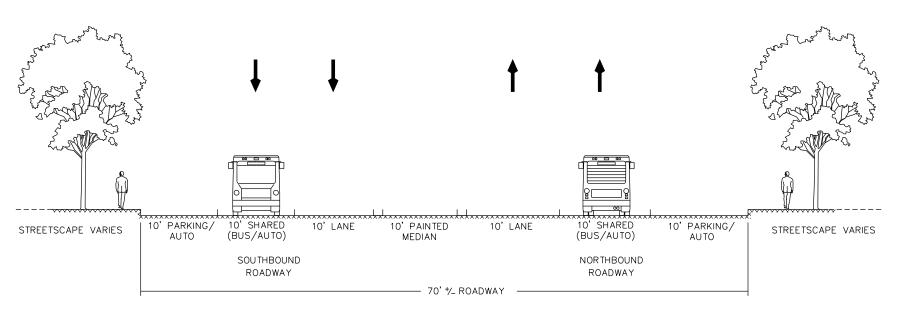








#### EXISTING TYPICAL SECTION - GRAND BOULEVARD BETWEEN PERSHING ROAD & RAILWAY BRIDGE



PROPOSED TYPICAL SECTION - GRAND BOULEVARD BETWEEN PERSHING ROAD & RAILWAY BRIDGE

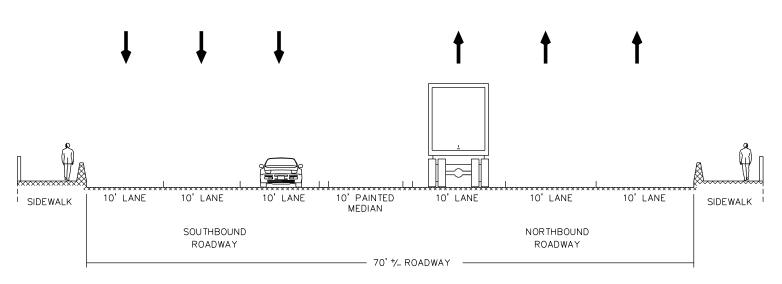
TYPICAL SECTION B-B. SEE SHEET GB-2.



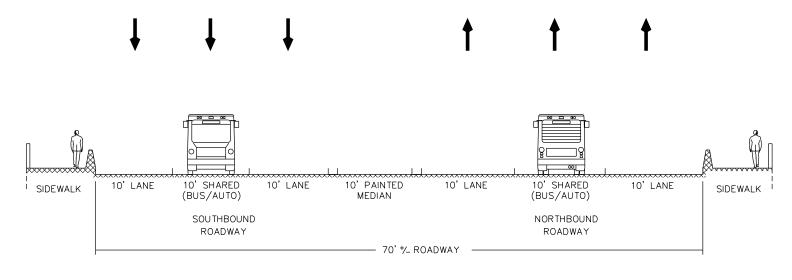








EXISTING TYPICAL SECTION - GRAND BOULEVARD ON BRIDGE OVER RAILWAY



PROPOSED TYPICAL SECTION - GRAND BOULEVARD ON BRIDGE OVER RAILWAY

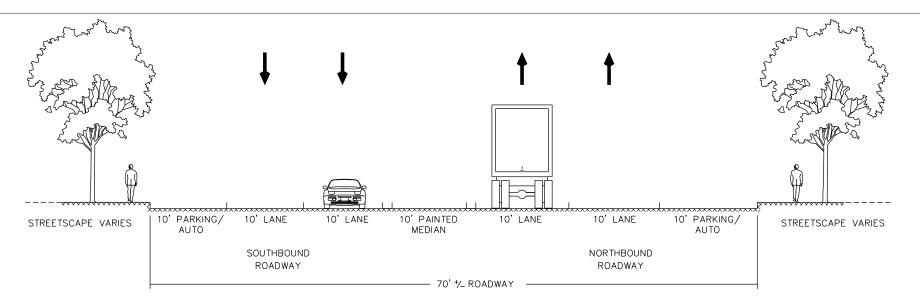
TYPICAL SECTION C-C. SEE SHEET GB-2.



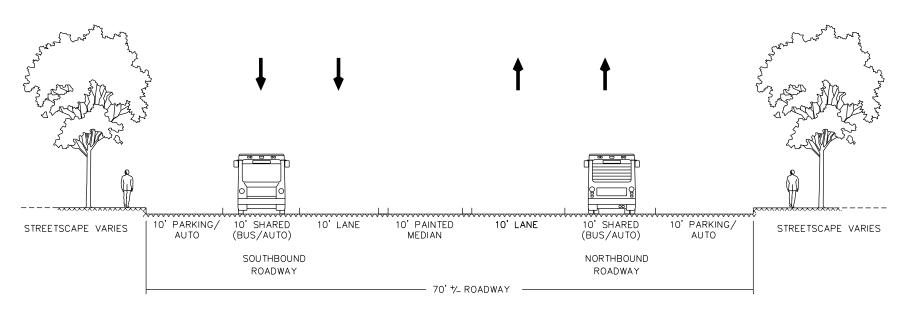








#### EXISTING TYPICAL SECTION - GRAND BOULEVARD BETWEEN RAILWAY BRIDGE & I-670 BRIDGE



PROPOSED TYPICAL SECTION - GRAND BOULEVARD BETWEEN RAILWAY BRIDGE & I-670 BRIDGE

TYPICAL SECTION D-D. SEE SHEET GB-3.

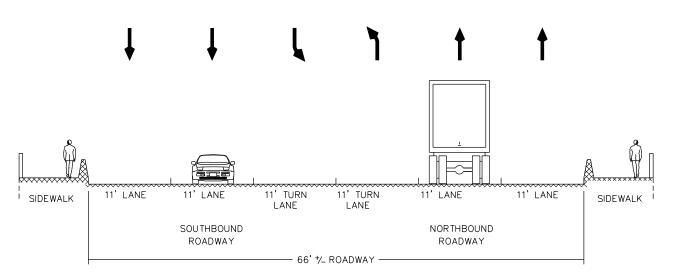






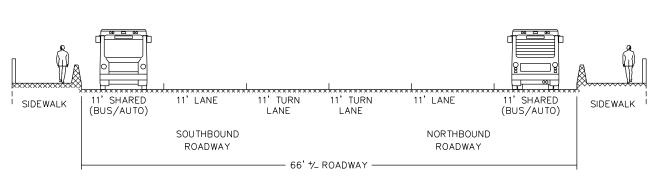






EXISTING TYPICAL SECTION - GRAND BOULEVARD ON BRIDGE OVER 1-670





PROPOSED TYPICAL SECTION - GRAND BOULEVARD ON BRIDGE OVER 1-670

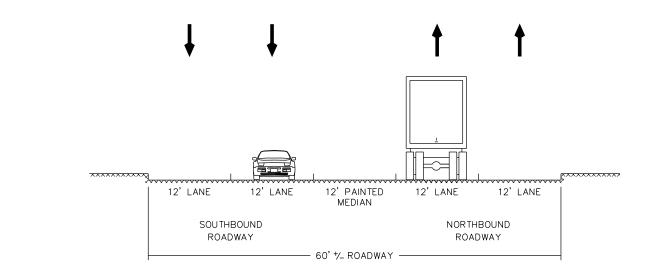
TYPICAL SECTION E-E. SEE SHEET GB-4.



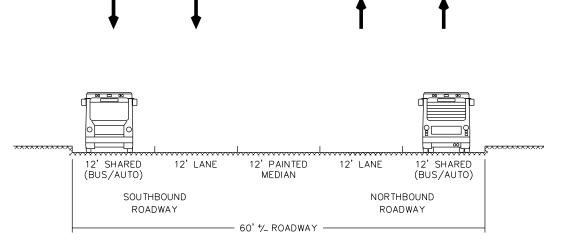








EXISTING TYPICAL SECTION - GRAND BOULEVARD BETWEEN I-670 BRIDGE & 13TH STREET



PROPOSED TYPICAL SECTION - GRAND BOULEVARD BETWEEN I-670 BRIDGE & 13TH STREET

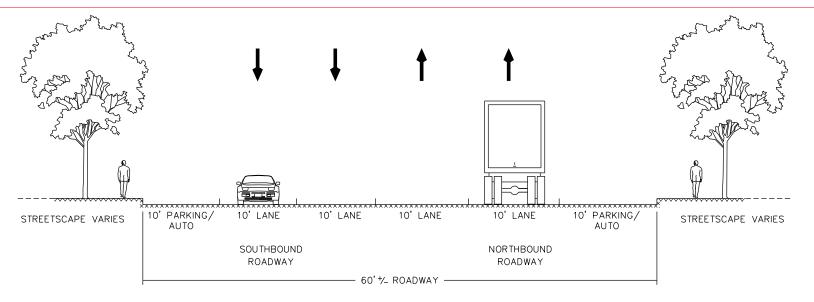
TYPICAL SECTION F-F. SEE SHEET GB-5.



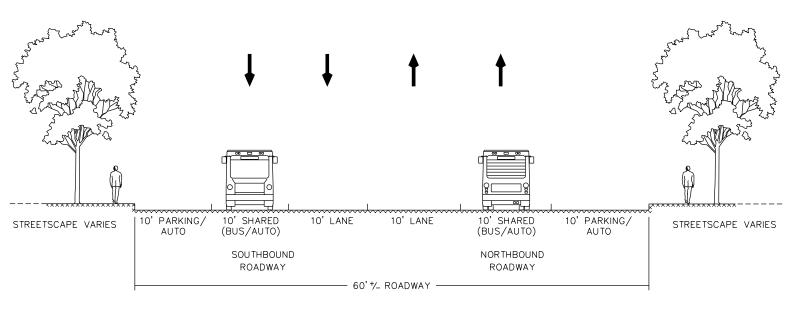








#### EXISTING TYPICAL SECTION - GRAND BOULEVARD BETWEEN 13TH STREET & 1-70 BRIDGE



PROPOSED TYPICAL SECTION - GRAND BOULEVARD BETWEEN 13TH STREET & I-70 BRIDGE

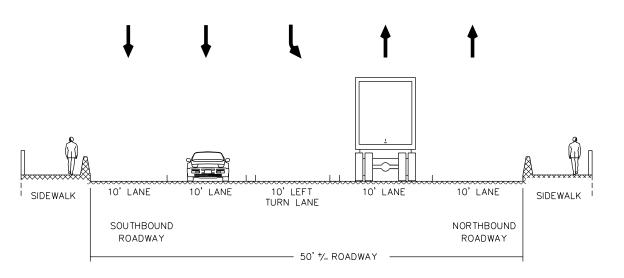
TYPICAL SECTION G-G. SEE SHEET GB-5.





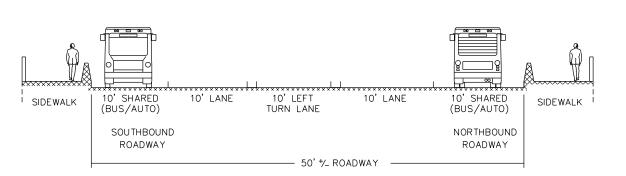






EXISTING TYPICAL SECTION - GRAND BOULEVARD ON BRIDGE OVER 1-70





PROPOSED TYPICAL SECTION - GRAND BOULEVARD ON BRIDGE OVER I-70

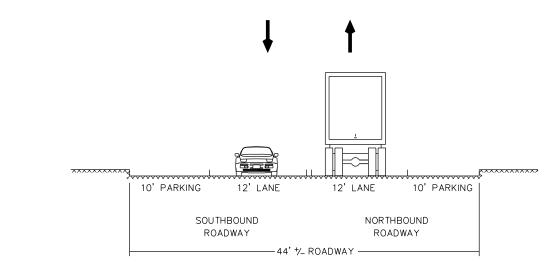
TYPICAL SECTION H-H. SEE SHEET GB-7.



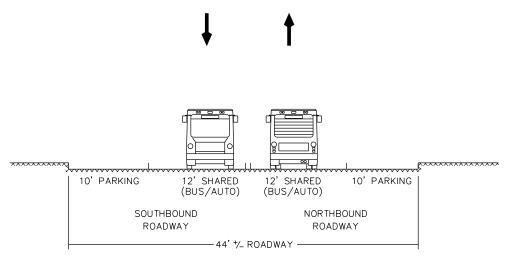








EXISTING TYPICAL SECTION - GRAND BOULEVARD BETWEEN I-70 BRIDGE & 3RD STREET



PROPOSED TYPICAL SECTION - GRAND BOULEVARD BETWEEN I-70 BRIDGE & 3RD STREET

TYPICAL SECTION I-I. SEE SHEET GB-8.









#### **Technical Memorandum**

### Results of Tier 1 Screening

#### **Executive Summary**

The evaluation process developed to select the Locally Preferred Alternative (LPA) for the Kansas City Downtown Corridor Alternatives Analysis (Downtown Corridor AA) consists of a two-step process. The first step involves an initial Tier 1 screening intended to narrow a long list of potential alignments into a short-list of alternatives, followed by a Tier 2 process in which the short-listed alternatives will be evaluated in more detail. This memo reports on the Tier 1 screening process.

The study team identified seven Tier 1 alignments that could potentially meet the goals and objectives of the Downtown Corridor Study. These alignments are intended to be "mode neutral" and could reasonably accommodate a variety of transportation modes, including streetcar or enhanced bus service. The Tier 1 alternatives were screened according to 13 criteria that are directly tied to the project goals articulated in the Purpose and Needs statement (see Table 1). These criteria include both qualitative and quantitative measures that were examined at varying levels of detail. The screening process focused on how well the alternative alignment fulfilled the screening criteria objective and assigned each alternative a rating of "Best", "Good", and "Fair". The ratings are relative to the other alternatives and should not be interpreted as an absolute score.

The differences between the alternatives are those that offer more potential and better choices in terms of improving transportation linkages, supporting existing activity centers and strengthening development potential. The preliminary results of the Tier I screening process show that **Grand Boulevard and Main Street received the highest number of "Best" ratings** (see Table 2).

- Grand Boulevard received best ratings for access to Downtown Kansas City's employment districts as well as other major activity centers. The alignment also offers potential to reduce the amount of surface parking downtown due to its proximity to several surface parking lots. Grand Boulevard also has the least impacts on existing utilities.
- Main Street received best ratings due to its location close to most of Kansas City's major activity
  centers and visitor facilities. Main Street offers the best potential to improve downtown
  circulation and to be integrated with existing transit services. In addition, the alternative ranked
  well in terms of being able to realize development and redevelopment potential. The alignment
  also received strong support from stakeholders and members of the public.



#### **Overview**

The evaluation process that has been developed to select the Locally Preferred Alternative (LPA) for the Kansas City Downtown Corridor Alternatives Analysis (Downtown Corridor AA) consists of a two-step process:

- An initial Tier 1 screening process that focuses on narrowing a long list of potential alignments into a short-list of alternatives.
- A Tier 2 evaluation in which short-listed alternatives will be evaluated in more detail.

This memo presents the results of Tier 1 screening process. The following text describes the screening process and results. Summary and backup documentation is included as Tables C1 - S3 and Figures C1.1 - S2.2.

#### Tier 1 Alternatives

The study team identified seven alignments that could potentially meet the goals and objectives of the Downtown Corridor study. The alignments are intended to be "mode neutral" and could reasonably accommodate a variety of transportation modes, including streetcar or enhanced bus service. The Tier 1 alternatives consist of two basic types: (1) "bi-directional" alignments in which service would operate in both directions along the same street and (2) "couplet" alignments in which service would operate northbound along one street and southbound along a parallel street. The Tier 1 alternatives consist of seven alignments: four bi-directional alignments and three couplets (see also Figures 1 and 2).

#### **Bi-directional Alternatives**

- 1. Grand Boulevard
- 2. Main Street
- 3. Walnut Street
- 4. Baltimore Street

#### **Couplet Alternatives**

- 5. Grand Boulevard/Walnut Street
- 6. Main Street/Walnut Street
- 7. Main Street/Baltimore Street

For each alternative, there are multiple options for how the service would serve the northern (River Market) and the southern (Union Station and Crown Center) ends of the Downtown Corridor. Because each of the Tier 1 alignments could be configured in multiple ways, the Tier 1 screening process did not consider service to the alignment ends as part of the screening process.

#### **Tier 1 Screening Process**

The Tier 1 alternatives were screened according to 13 criteria that are directly tied to the project goals articulated in the Purpose and Needs statement (see Table 1). These criteria include both qualitative and quantitative measures that were examined at varying levels of detail.

For each criterion, the study team considered how well the alternative alignment fulfilled the screening criteria objective and assigned each alternative a rating of "Best", "Good", and "Fair". The ratings reflect relative, rather than absolute scores. The screening process involved combining qualitative and



quantitative data as well as comparing and contrasting the alternatives against each other. As a result, an alternative's rating can only be interpreted relative to the other alternatives. Additionally, because the alternatives are located close to each other, the differences between alternatives was subtle. Consequently, in some cases, more than one alternative received a "Best" rating and in other cases, none of the alternatives received a "Best" rating. Likewise, when there were no discernable differences between alternatives each alternative received the same rating.

As discussed in previous technical memos, the approach used in the Tier I screening process involved measuring each alignment against each criteria individually. We have not summarized the conclusions into a single quantitative score to avoid assigning values to qualitative measures and prioritize the ranking of one criterion against another. Instead, the screening process shows the relative score of each alternative performed against the 13 criteria. Taking into consideration all of findings of the screening process, the highest performing alternatives were determined to be those received the most "Best" ratings.

**Table 1: Tier 1 Screening Criteria** 

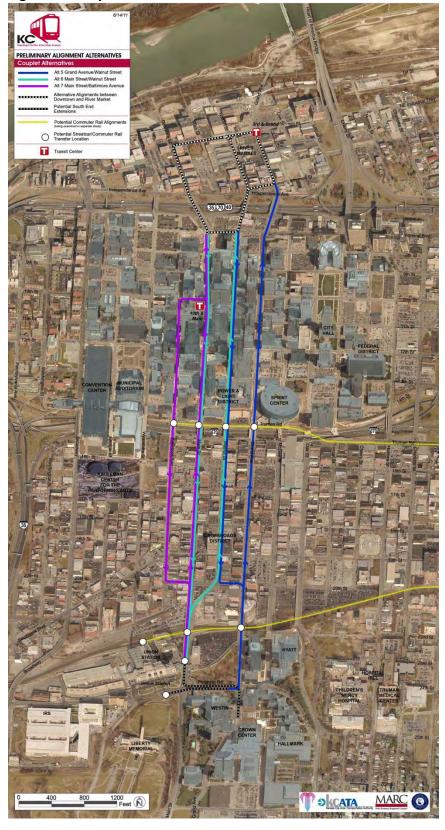
<b>Project Goal</b>	Screening Criteria
Connect	C1: Improve circulation within the Downtown Corridor; Improve transportation
	options
	C2: Improve connections between existing downtown activity centers
	C3: Improve pedestrian and bicycle environment
Develop	D1: Support development and redevelopment; provide catalyst for new development
	and redevelopment
	D2: Increase number of downtown residents
	D3: Support development of new activity centers
Thrive	T1: Support existing residential and employment centers
	T2: Support visitor and special event activities
	T3: Reflect public and stakeholder input
Sustain	S1A: Develop cost-effective transit solutions; improve effectiveness and efficiency of
	existing transit services
	S1B: Provide reliable transit services
	S2: Reduce the amount of surface space devoted to parking
	S3: Impact on utilities and their potential need for modification or relocation







Figure 2: Couplet Alternatives



#### **Key Assumptions**

The evaluation process involved a number of assumptions. Among the most critical of these is determining the influence (or capture) area associated with each alignment. In general, the public transportation industry considers transit with walking distance of a destination if it is within ¼ mile of the route or service. As a result, a ¼ mile buffer was used to determine if an activity center is accessible to (or is served by) transit. This buffer was used as to determine access for criterion associated with population and employment (i.e. when people are walking to/from the alignments). For development impacts, however, the study team also based the influence area on the ¼ mile buffer but used a slightly broader interpretation of the rule (see below).

#### Walking Distances

For the bidirectional alternatives, setting a ¼ mile walking buffer is straight-forward. The study team drew a ¼ mile around the alignment and considered this area to be within walking distance of the alignment. For the couplet alternatives, however, only the area within a ¼ mile within both legs of the couplet was considered within the walking distance of the alignment. This assumption means that walking distance to and from the couplets is smaller as compared with the bidirectional alternatives. The reasoning behind this assumption is that both legs of the couplet must be within ¼ mile of the activity center to be considered within walking distance.

#### **Development Impacts**

For development impacts, as discussed, the study team also used the ¼ mile buffer but defined it slightly more broadly. Couplets operate on two parallel streets; instead of requiring both legs of the alignment to be within a ¼ buffer, we allowed the influence area to be ¼ of mile of each leg. As a result, the influence area is larger. This reflects assumptions that development potential is not absolutely tied to walking distance and being close to the alignment, even if it operates only in one direction, is sufficient to encourage development.

Note that no buffer was used at the northern end of the alignments, i.e. the area around City Market because the routing for any potential service has not yet been determined. On the southern end, the buffer is based on the end point of the alignment without any assumption made about a spur along Pershing Road.

#### **Preliminary Findings: Tier 1 Screening**

The alternatives have different strengths and weaknesses and each option offers potential as a viable Downtown Corridor. The differences between the alternatives are those that offer more potential and better choices in terms of improving transportation linkages, supporting existing activity centers and strengthening development potential. The preliminary results of the Tier I screening process show that **Grand Boulevard and Main Street received the highest number of "Best" ratings** (see Table 2).

The strengths and weaknesses of each of the alternative alignments are summarized below, starting with Main Street and Grand Boulevard:

Grand Boulevard (Alternative 1) - Grand Boulevard was one of the two alternatives that
received a greater number of "Best" ratings. Two of the "Best" ratings are associated with
providing connections to downtown activity centers and access to employment and residential
areas. While several of the alternatives offered access to many of Downtown Kansas City's



primary activity centers (Sprint Center, Power and Light District, Crown Center, Union Station, Convention Center), Grand Boulevard is the only alternative that is accessible to/from the Government District. The Government District is a major employment center, thus the Grand Boulevard alternative is accessible to/from the largest number of jobs.

Grand also has fewer and less significant utility impacts, so it scored high in this criterion as well. Finally, there are several surface parking lots along Grand Boulevard, thus the alternative rated well in terms of offering potential to reduce the amount of surface parking.

As compared to the other alternatives, Grand Boulevard is less effective in supporting visitor and special event activities, due to its distance from the Convention Center and Kauffman Center for the Performing Arts Center. Ratings associated with transit service reliability were also low due to the high number of street closures and potential service conflicts associated with events at the Sprint Center.

• Main Street (Alternative 2) - Main Street received five Best ratings. The Best ratings are associated with several factors, including Main Street's strategic location in the center of Downtown Kansas City, making it accessible to visitor and special event activities as well as most of Downtown Kansas City's major activity centers. Main Street also rated well in terms of improving circulation in downtown, because it is located adjacent to the 10th and Main Transit Plaza, currently Kansas City's largest and most comfortable transfer locations. In addition, Main Street also offers potential in terms of development and redevelopment impacts; the alignment is a higher value corridor, thus new development also has potential to achieve high values.

Finally, Main Street is the alternative most preferred by members of the public and stakeholders. Public comment largely echoes other findings associated with Main Street being in the heart of Downtown Kansas City and equidistant from most major activities.

The only criterion that Main Street did not perform well on is the ability to reduce the amount of surface parking in Downtown. This rating reflects the fact that there are fewer surface parking lots along the corridor.

Walnut Street (Alternative 3) – Walnut Street generally performed well in the Tier 1 screening
criteria process, but lacked a compelling reason to keep the corridor under consideration. The
strengths of the corridor are that it is well positioned in Downtown Kansas City in terms of
access to existing employment, activity centers, and visitor attractions.

Walnut Street, however, is not a primary commercial corridor and consequently, tends to serve "back door" rather than primary access to some of Downtown's major buildings and attractions. In addition, because Walnut Street is not a primary commercial corridor, putting new transit services on Walnut Street would more likely dilute rather than strengthen the existing transit network. It also has less compelling potential development impacts with fewer vacant parcels and fewer larger sized parcels.

• **Baltimore Avenue (Alternative 4)** – Baltimore Avenue, like Walnut Street, performed well in the Tier 1 screening criteria process overall, but without exceptional performance in any of the criteria. Baltimore Avenue's strengths include a fairly strategic location in Kansas City with



access to many of Downtown's activity centers, and visitor attractions. The corridor also offers a relatively better location to/from existing residential development and, consequently the best potential to encourage future residential development.

Some of the challenges associated with a Baltimore Avenue alignment are the distance and grade associated with travel to/from the Government District, Downtown's highest concentration of employment. Also, like Walnut Street, Baltimore Avenue is not a primary commercial corridor and tends to provide "back door" access to several of Downtown's main commercial centers. This also means that new transit services would more likely dilute rather than strengthen the existing transit network.

• **Grand Boulevard and Walnut Street (Alternative 5)** – The Grand Avenue/Walnut Street couplet alternative produced mixed results in the Tier 1 screening. Both streets are well positioned, such that the couplet provides access to Downtown employment and population, although less than the bidirectional option on Grand Boulevard. The Grand/Walnut couplet also ranked high in terms of potential to support development and reduce the amount of surface parking downtown. The high ranking largely reflects the couplet design which encompasses a larger area that could be positively influenced for development through improved transportation infrastructure.

Most of the challenges associated with the Grand Boulevard and Walnut Street alternative reflect challenges inherent to a couplet design. Operating service on two streets is a less intuitive service design (i.e. boarding on street and alighting on another). The impact of the service design would affect not only future corridor service, but also existing and future bus service. As a result, transit benefits are relatively more diluted as compared with the other alternatives. Couplets also have increased impacts on the utility system because they require construction and operations on two streets rather than one.

• Main Street and Walnut Street (Alternative 6) – The Main and Walnut Street alternative performed well in terms of access to/from Downtown's major activity centers as well as several of the visitor and special event activities. Like the other couplets, the Main/Walnut alignment also offers stronger potential to support development and redevelopment because it influences a larger area. The couplet also has few issues with service reliability associated with street closures.

Consistent with other couplet designs, the Main/Walnut couplet creates a less intuitive service design. However, the Main/Walnut couplet serves the 10<sup>th</sup> and Main Transit Plaza and thus would partially help strengthen the existing Downtown transit resources, although to a lesser extent than the bidirectional alignment on Main Street. Lastly, couplets have increased impacts on the utility system because they require construction and operations on two streets rather than one.

Main Street and Baltimore Avenue (Alternative 7) – The Main Street and Baltimore Avenue
couplet received a best rating for its ability to support development and redevelopment. This
best rating reflects a larger influence area that includes a fairly large number of vacant parcels
along the couplet corridors. The location of the couplet along Main Street and Baltimore Avenue



also means that the alignment is within walking distance of a large number of activity centers and visitor attractions.

Some of the challenges associated with the Main/Baltimore couplet are associated with the less intuitive service design and the relative impact on the Downtown transit network. As a result, as compared with other alternatives, especially the bidirectional ones, the Main/Baltimore couplet is less supportive of efficient and effective transportation options in Downtown. Also, as mentioned, couplet alignments had more utility impacts as compared with bidirectional options due to operations on two streets.

Other findings from the Tier 1 Screening process include:

- Overall, bi-directional alignments scored higher than the couplets. A critical exception to this
  rule is the ability of the alternative to support development and redevelopment. Because
  couplets operate on two streets, the alignments will influence a larger area in Downtown Kansas
  City and thus have a greater potential to support development. Only the Main Street alternative
  rated as strongly in terms of development and redevelopment potential.
- The couplets scored less well as compared to the bi-directional alternatives in several other screening criteria, namely:
  - With service on two separate streets, couplets have less intuitive service design because riders would board and alight from the service in different locations. This service design also creates relatively confusing interfaces with bus services, especially with east-west connections operating on one-way streets. Consequently, the couplets are less effective at improving transportation options.
  - Walking distance to/from the couplet alternatives is smaller than some of the bidirectional options and thus these alignments were less accessible to/from Downtown Kansas City activity areas.
  - Because the couplets alternatives affect two streets, they have increased impacts on utility systems.
  - Finally, results from initial stakeholder meetings and a single public workshop suggest that the couplet alternatives are less attractive to stakeholders and members of the public.
- There is little difference between the alignments in terms of increasing the number of residents in Downtown Kansas City, thus none received a Best rating. This finding reflects the fact that Downtown Kansas City is currently heavily oriented toward employment, with jobs outnumbering employment 10 to 1. Downtown Corridor service could help support residential development; this criterion will be evaluated more closely in the Tier 2 evaluation.
- Initial screening of the alternatives included looking at the ability of the service to improve
  transit service to transit dependent populations (i.e., low income or zero vehicle household,
  individuals with a disability, individuals aged 65 or more or minority individuals). The analysis
  found that because the number of people living in the downtown corridor is small, the number
  of transit dependent individuals is likewise small. There is no difference between the
  alternatives, thus this screening criteria was not carried forward.



Results of the Tier 1 screening process are summarized in Table 2 and details on the individual criteria and each alignment are included as Tables C1 - S3 and Figures C1.1 - S2.2.



# Regional Alternatives Analysis:

Table 2. T	Γier 1 scre	ening su	mmary m	atrix												
Alternative	C1. Downtown Circulation	C2. Activity Center Connections	C3. Bicycle & Pedestrian Connections	D1. Development & Re- development	D2. Downtown Residents	D3. New Catalyst Projects	T1. Residential & Employment Support	T2. Visitor & Special Events	T3. Public & Stakeholder Input	S1A. Transit Efficiency & Effectiveness	S1B. Reliable Service	S2. Surface Parking Reduction	S3. Utility Impacts	Best	Good	Fair
1 Grand	Good	Best	Good	Fair	Good	Fair	Best	Fair	Good	Good	Fair	Best	Best	4	5	4
2 Main	Best	Best	Good	Best	Good	Good	Good	Best	Best	Good	Good	Fair	Good	5	8	1
3 Walnut	Fair	Good	Good	Good	Good	Fair	Good	Good	Good	Fair	Fair	Good	Fair	0	8	5
4 Baltimore	Good	Good	Fair	Good	Good	Good	Good	Good	Good	Fair	Good	Good	Good	0	11	2
5 Grand Walnut	Fair	Fair	Good	Best	Good	Good	Good	Fair	Fair	Fair	Fair	Best	Fair	2	4	7
6 Main Walnut	Fair	Fair	Good	Best	Good	Good	Fair	Good	Fair	Fair	Fair	Good	Fair	1	5	7
7 Main Baltimore	Fair	Fair	Fair	Best	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair	1	6	6

Conclusions: Alternative 2 (Main Street) is the highest rated alignment after considering all objectives. It received an equal number of "Best" ratings as Alternative 1 (Grand Boulevard) and a higher number of "Good" ratings. This is mainly a result of Main Street's connections with downtown activity centers, special event venues, and transportation options, as well as its potential for development/redevelopment. Alternative 1 (Grand Boulevard) is second due to a few more "Fair" ratings. Grand Boulevard has good connections to employment centers and other activity centers, and has the best pedestrian and bicycle environment, but it doesn't support visitor and special event activies as well as other alternatives. The reliability of transit service along Grand Boulevard also rates lower than other options. In general, the bidirectional alignments rate higher than the couplet ones, primariliy due to the smaller service area that reduces the number of transit and activity center connections. Service would also be less intuitive with the couplet alignments, and interactions with the local bus service would have to be carefully considered.

Notes: Walking distance analyses for the couplet alignments considers the area that can be reached by both the northbound and southbound trips, while development impact analyses for the couplets considers the area that can be reached by either the northbound or southbound trips.



Alternative	Serves 10th & Main Transit Center	Other Considerations	Fulfills Objective
1 Grand	No (2 blocks away)	It may be desirable to move many existing bus routes from Grand Boulevard to Main Street to focus streetcar service on one major north-south arterial and bus service on the other (Main Street). This would provide very strong transit service on both primary Downtown Corridor arterials. The Grand Boulevard alignment would not directly connect with the 10th & Main Transit Center, which would be a more convenient and comfortable transfer location than locations along Grand Boulevard (since passengers could wait on-board KCATA buses that layover at 10th & Main).	Good
2 Main	Yes	It would likely be desirable to move Main Street MAX from Main Street to Grand Boulevard in order to provide premium transit service on both major north-south arterials. This would provide very strong transit service on both primary Downtown Corridor arterials. Also, this alignment would directly serve the 10th & Main Transit Center, which is currently the most attractive and comfortable transfer location in downtown.	Best
3 Walnut	No (1 block away)	Existing bus routes would likely stay focused on Main Street and Grand Boulevard, so this alignment creates three parallel north-south streets with strong transit service. This could dilute transit benefits.	Fair
4 Baltimore	Yes	Existing bus routes would likely stay focused on Main Street and Grand Boulevard, so this alignment creates three parallel north-south streets with strong transit service. This could dilute transit benefits. However, this alignment would directly serve the 10th & Main Transit Center, which is currently the most attractive and comfortable transfer location in downtown.	Good
5 Grand Walnut	No (1 - 2 blocks away)	This alignment would produce a less intuitive overall transit service design with two-way bus service on Grand Boulevard but only one-way streetcar/enhanced bus service. Local bus connections would be on the same street in one direction but on another street in the opposite direction.	Fair
6 Main Walnut	Yes (only in one direction)	This alignment would produce a less intuitive overall transit service design with two-way bus service on Main Street but only one-way streetcar/enhanced bus service.	Fair
7 Main Baltimore	Yes (both directions)	This alignment would produce a less intuitive overall transit service design with two-way bus service on Main Street but only one-way streetcar/enhanced bus service. However, this alignment would directly serve the 10th & Main Transit Center, which is the most attractive and comfortable transfer location in downtown.	Fair

**Conclusions:** Bidirectional alignments would produce a more intuitive service design, especially in terms of interaction with local bus service. Couplet alignments could result in somewhat confusing interfaces with local bus service. Alignments that use Main Street and/or Baltimore Avenue would serve the 10th & Main Transit Center, which is currently a key downtown bus location. Overall, Alternative 2 (Main Street) would provde the best connections, followed by Alternatives 1 (Grand Boulevard) and 4 (Baltimore Avenue), but effective connections could be provided with all alignments.

**Notes:** KCATA would likely reconfigure service in the Financial and Government Districts to make it simpler and more straightforward. This could be accomplished equally well with all alignments. This downtown service reconfiguration would allow all alignments to provide "last mile connectivity" equally well. Bus services could also be easily reconfigured in the Crown Center/Union Station area to provide effective connections to all alignments. Finally, all alignments would connect equally well with regional rail and transit services from Johnson County.



Table C2: Improve connections between existing downtown activity centers										
Major Activity Centers Within 1/4 Mile of Alignment	Summary	Fulfills Objective								
12	Close to the Sprint Center, Power & Light District, City Hall, Union Station, Crown Center, and many activity centers in the Government District. Does not directly serve the Convention Center or the Kaufmann Center for the Performing Arts. It would be farthest from activity centers to the west such as the Convention Center, but perceived distances could be shortened through the development of attractive pedestrian corridors.	Best								
11	Close to the Sprint Center, Power & Light District, Union Station, Crown Center, the Convention Center, and the Kaufmann Center for the Performing Arts. Does not directly serve the Government District. Main Street provides a large amount of physical space in which to implement Downtown Corridor service and streetscape improvements. Main Street also "splits the distance" between most major activity centers, and coupled with attractive pedestrian connections, could provide the best connections.	Best								
12	Includes much of the same area covered by the Grand Boulevard alignment, minus some of the Government District (e.g. the Bolling Federal Building, County Courthouse, and State Office Building). Directly serves the Convention Center and Kaufmann Center for the Performing Arts. Since Walnut Street is a secondary street, it would provide service more to the "back doors" of Grand Boulevard and Main Street activities, rather than direct front door service on one of these primary corridors. Also, KCATA services will remain focused on Grand Boulevard and/or Main Street, potentially creating less convenient interfaces with other transit services.	Good								
11	Similar connections to activity centers as Main Street. Does not directly serve the Government District or some large office centers south of the Sprint Center. As with Walnut Street, service along Baltimore Avenue could be perceived as service to the "back door" of Grand Boulevard rather than high quality service through a primary corridor. Again similar to Walnut Street, KCATA services will remain focused on Grand Boulevard and/or Main Street, potentially creating less convenient interfaces with other transit services. Baltimore Avenue is also the farthest from the Government District, and walks between the two through the Main Street "valley" is perceived as difficult by some.	Good								
10	Lowest number of activity centers served because the Government District is not directly served along with some areas west of Walnut Street. Would combine the pros and cons of the Grand Boulevard and Walnut Street bidirectional alignments. Also, with service split between two streets, connections with other services and boarding locations for reverse trips would be less intuitive.	Fair								
11	Similar activity center connections as Main Street. Would combine the pros and cons of the Grand Boulevard and Walnut Street bidirectional alignments. As with other couplet alignments, with service split between two streets, connections with other services and boarding locations for reverse trips would be less intuitive.	Fair								
11	Similar activity center connections as Main Street. Would combine the pros and cons of the Grand Boulevard and Walnut Street bidirectional alignments. As with other couplet alignments, with service split between two streets, connections with other services and boarding locations for reverse trips would be less intuitive.	Fair								
	Major Activity Centers Within 1/4 Mile of Alignment  12  11  12  11  10	Major Activity Centers Within 1/4 Mile of Alignment  Close to the Sprint Center, Power & Light District, City Hall, Union Station, Crown Center, and many activity centers in the Government District. Does not directly serve the Convention Center or the Kaufmann Center for the Performing Arts. It would be farthest from activity centers to the west such as the Convention Center, but perceived distances could be shortened through the development of attractive pedestrian corridors.  Close to the Sprint Center, Power & Light District, Union Station, Crown Center, the Convention Center, and the Kaufmann Center for the Performing Arts. Does not directly serve the Government District. Main Street provides a large amount of physical space in which to implement Downtown Corridor service and streetscape improvements. Main Street provides a large amount of physical space in which to implement Downtown Corridor service and streetscape improvements. Main Street also "splits the distance" between most major activity centers, and coupled with attractive pedestrian connections, could provide the best connections.  Includes much of the same area covered by the Grand Boulevard alignment, minus some of the Government District (e.g. the Boiling Federal Building. County Courthouse, and State Office Building). Directly serves the Convention Center and Kaufmann Center for the Performing Arts. Since Walnut Street is a secondary street, it would provide service more to the "back doors" of Grand Boulevard and Main Street activities, rather than direct front door service on one of these primary corridors. Also, KCATA services will remain focused on Grand Boulevard and Main Street activities, rather than direct front door service on one of these primary corridors. Also, KCATA services will remain focused on Grand Boulevard and Main Street, Detartically creating sets convenient interfaces with other transit services on Grand Boulevard and Walnut Street State of Grand Boulevard and Walnut Street Moule Center. As with Walnut Street Walnut Stre								

Conclusions: Alternatives 1 (Grand Boulevard) and 2 (Main Street) would provide the best opportunities for the development of high quality Downtown Corridor service with the most convenient connections to activity centers and other transit services. The alignments generally serve the Sprint Center, Power & Light District, Crown Center, and Union Station, but there is often a tradeoff between service to the Government District and the Convention Center/Kaufmann Center for the Performing Arts. Walnut Street bridges both areas somewhat but does not reach the entire Government District and the Convention area is on the western edge of its service area.

Notes: "Directly served" areas are those that are within a 1/4 mile buffer of each alignment. The analysis for the couplet alignments, however, only considers the area that can be reached by both the northbound and southbound trips. When overlaying service area buffers from the bidirectional alignments to discover the couplet service area, only the area of intersection is fully served by the couplets.



lternative	Primary Road Configuration	Pedestrian Environment	Bicycle Environment	Fulfills Objective
1 Grand	2 traffic lanes in each direction (3 during peak periods) Vehicle parking on both sides of street (off peak periods) Sidewalks	Offers good pedestrian environment with wide streets and front door access to major activity centers. Traffic volumes are generally low, but speeds can be high	Only street currently designated as a Bike Route by Bike KC (from 12 <sup>th</sup> Street north through the River Market, and also south of Pershing). Parking may need to be modified to accommodate bikes. Bikes may also be accommodated on adjacent streets.	Good
2 Main	2 traffic lanes in each direction Limited on-street parking Dedicated bus lanes along some segments Sidewalks	Major route for pedestrians with many activity centers and commercial activity. Generally good environment for pedestrians.	Limited on-street parking improves environment for bicyclists but bus only lanes (peak period) may create potential conflicts during peak periods and for some directions only. Bikes may also be accommodated on adjacent streets.	Good
3 Walnut	Combination of one-way and two-way travel 4 travel lanes On-street parking and dedicated bus lanes in segments Sidewalks	Major route for pedestrians that traverses middle of the Power & Light entertainment district. The street has lower traffic volumes than Main Street and Grand Boulevard, which makes it a good street for pedestrians.	Has lower traffic volumes than other major street, but on street parking and bus only lanes creates potential conflicts for bicyclists. On-street parking may need to be modified to accommodate bikes. One-way northbound segment (north of 12th St) may also deter cyclists. Bikes may also be accommodated on adjacent streets.	Good
4 Baltimore	One-way north of 12 <sup>th</sup> Street; two-way south of 12th On-street parking including angled parking south of 14 <sup>th</sup> Street Sidewalks	Pedestrian environment varies along corridor, with some segments more attractive than others, but has lowest traffic volume of four corridor alternatives.	Bicycle environment varies considerably due to one-way traffic patterns and angled parking. Improving bicycle environment would require changing angled parking, which is especially difficult for bicyclists. Bikes may also be accommodated on adjacent streets.	Fair
<b>5</b> Grand Walnut	See Grand and Walnut	Both Grand and Walnut have good pedestrian environments.	Grand is an attractive corridor for bicyclists. With some changes, Walnut offers adequate bicycle environment.	Good
6 Main Walnut	See Main and Walnut	Main and Walnut have good pedestrian environments.	Both Main and Walnut offer adequate bicycle environment with some challenges associated with on-street parking and one-way traffic patterns.	Good
7 Main Baltimore	See Main and Baltimore	Both Main and Baltimore have good pedestrian environments.	Main offers offer adequate bicycle environment with some challenges. Baltimore would require changes to angled parking to accommodate bicyclists.	Fair



# Regional Alternatives Analysis:

### Table D1: Support development and redevelopment; provide catalyst for new development and redevelopment Within ¼ Mile of Alignment **Relative Value of Relative Value of Vacant Parcels Developed Relative Value of Potential Alternative** (Million Sq. Ft.) Parcels **Vacant Parcels** Redevelopment Summary **Fulfills Objective** Service area excludes a cluster of vacant parcels between Wyandotte and Central Streets, 1.01 0.92 Fair 2.74 0.99 which have large potential for development (the prime reason for this alternative having the lowest potential). Includes a cluster between Oak and Locust Streets. Higher potential for redevelopment, largely due to the high value of developed parcels in 2.96 1.02 1.00 1.01 Best this corridor. Service area does not include a cluster of vacant parcels between Oak and Locust Streets, 2.93 1.00 1.00 0.97 along with Central Street and Broadway Boulevard. The latter cluster of vacant parcels have Good high potential for redevelopment, leading to this alternative's smaller overall potential. Highest inventory of vacant parcels available for redevelopment among the bidirectional 3.02 1.02 1.04 1.01 alternatives, though the value of developed parcels on the western side of the corridor is Good Couplet design involves more parcels for development due to the larger influence area. 0.94 1.03 3.20 0.97 Largest inventory of vacant parcels among all alternatives, which results in a high potential Best for redevelopment. 3.12 0.99 0.98 1.03 Couplet design involves more parcels for development due to the larger influence area. Couplet design involves more parcels for development due to the larger influence area. 1.03 1.03 3.10 1.01 Lowest inventory of vacant parcels among the couplet alternatives, but high value of Best developed parcels in this service area results in a higher potential for redevelopment.

Conclusions: Couplet alternatives have a larger influence area and therefore generally have a greater potential to spur redevelopment. Main Street also has a high potential largel due to the high value of the developed parcels in the corridor. Due to the geographic distribution and clustering of vacant parcels, the alternatives that serve more western areas generally have more vacant parcels available for development. However, a significant factor in determining an alternative's potential for redevelopment is the increase in value associated with development, so areas with the greatest difference in value between developed and vacant parcels will have high potential for redevelopment.

**Notes/Source:** This assumes vacant parcels that are redeveloped would increase in value to approximate the average developed parcel in the corridor. In reality, redeveloped parcels oftenappreciate even higher due to the added value of streetcar service (typically 15% or higher), though this additional appreciation is not included, which results in a conservative estimate of the redevelopment potential. "Vacant" parcels are those considered vacant (without a structure) in Jackson County's assessment GIS database and often includes parcels that would be considered underdeveloped, such as surface parking. Data is from Jackson County Assessor GIS database.



Table D2: Increase number of downtown residents  — Within ½ Mile of Alignment —										
		of Alignment —								
Alternative	Vacant Parcels (Million Sq. Ft.)	Population	Summary	Fulfills Objective						
1 Grand	2.73	4,380	In general, the western side of the corridor is slightly more oriented toward residential uses than the east. Expansion of existing areas with a residential presence would be more likely than the development of entirely new residential areas. However, there are clusters of residential development between Grand Boulevard and Walnut Street in the Financial District, just south of the Power & Light District, and between 20th Street and 22nd Street. A Grand Boulevard alignment could spur additional residential development in those areas.	Good						
2 Main	2.70	4,970	Could serve most existing residential development, as well as new development in those areas, although less directly than Grand Boulevard or Walnut Street alignments.	Good						
3 Walnut	2.76	4,663	A Walnut Street alignment would serve many of the same residential clusters as the Grand Boulevard. However, since Grand Boulevard and Main Street are primarily commercial streets, and would remain so even with Downtown Corridor service on Walnut Street, a Walnut Street alignment could potentially become more residentially oriented than either Grand Boulevard or Main Street.	Good						
4 Baltimore	2.81	4,893	Would provide the best service to Quality Hill (although much of the area would be beyond ¼ mile) and could make housing in this area more attractive and attract new residential development.  In a similar manner as Walnut Street, a Baltimore Avenue alignment could potentially become more residentially oriented than either Grand Boulevard or Main Street.	Good						
5 Grand Walnut	2.50	4,380	Impacts would likely be a cross between those for Alignments 1 and 3.	Good						
6 Main Walnut	2.53	4,647	Impacts would likely be a cross between those for Alignments 2 and 3.	Good						
<b>7</b> Main Baltimore	2.68	4,893	Impacts would likely be a cross between those for Alignments 2 and 4.	Good						

Conclusions: Alternatives 2 (Main Street) and 4 (Baltimore Avenue) would likely be slightly more supportive of new residential growth, although the differences between all alignments would be small.

Notes/Sources: At the present time, the Downtown Corridor is heavily oriented toward employment, and jobs outnumber residents approximately 10 to 1. The largest cluster of residential development is in Quality Hill, much of which is more than ¼ mile from all alignments. Other clusters are all small. The map shows the block bounded by 10th & 11th Streets and Locust & Cherry Strees as vacant. However, this has since been developed into the JE Dunn Construction World Headquarters. The analysis for the couplet alignments only considers the area that can be reached by both the northbound and southbound trips. When overlaying service area buffers from the bidirectional alignments to discover the couplet service area, only the area of intersection is fully served by the couplets. Data from Jackson County Assessor GIS database and the 2007 KCMO travel demand model (adapted from MARC).



Table D3: S		"catalyst" deve		jects _	
Alternative	Acres of Vacant Parcels	Acres of Large Parcels (>1 acre)	Number of Large Parcels (>1 acre)	Summary	Fulfills Objective
1 Grand	61.5	18.6	24	Does not serve a cluster of large-sized parcels along Wyandotte Street from 6 <sup>th</sup> Street to 11 <sup>th</sup> Street; the only alignment to serve a cluster between 10th and 11th Streets west of Locust Street (East Village).	Fair
2 Main	67.2	19.5	24	Serves large parcels between 9th and 10th Streets west of Central Street and parcels along Wyandotte Street north of 11th Street.	Good
3 Walnut	66.3	18.4	20	Same as Alternative 2 but does not include large parcels between 9th and 10th Streets west of Central Street.	Fair
4 Baltimore	68.8	21.1	27	Serves a cluster of large-sized parcels between 8th and 6th Streets from Central Street to Baltimore Avenue; the only alternative to serve a cluster of parcels along Broadway Street just south of 12th Street.	Good
5 Grand Walnut	72.5	20.1	27	Couplet design expands the influence on vacant parcels. Largest inventory of vacant parcels.	Good
6 Main Walnut	70.7	19.5	24	Couplet design expands the influence on vacant parcels. Does not serve a cluster of vacant parcels between 10th and 11th Streets west of Locust Street (East Village).	Good
7 Main Baltimore	70.4	21.1	27	Couplet design expands the influence on vacant parcels. Largest inventory of large parcels with the potential to become catalyst development projects.	Good

**Conclusions:** The couplet alternatives have an expanded service area and therefore have the potential to influence more vacant parcels. All alternatives have a relatively similar potential to support development of new activity centers because each alternative serves a common set of large parcels between Wyandotte and Oak Streets. Depending on the alternative, one cluster of large parcels to the east (East Village) may be served and three clusters of large parcels to the west may be served. These four parcel clusters result in the minor differences between alternatives.

Notes/Source: The analysis for the couplet alignments considers the area that can be reached by either the northbound or the southbound legs. Land use GIS data from Jackson County.



Table T1: S			al and employment centers	
Alternative	Population	le of Alignment Employees	Summary	Fulfills Objective
1 Grand	4,380	51,551	Highest number of employees because it is close to the Sprint Center, Power & Light District, City Hall, Union Station, Crown Center, and many activity centers in the Government District. However, lowest population because there are very few residential areas along Grand Boulevard.	Best
2 Main	4,970	47,919	Close to the Sprint Center, Power & Light District, Union Station, most of Crown Center, the Convention Center, and the Kaufmann Center for the Performing Arts. The service area does not include the Government District, which mostly accounts for the lower employment numbers. Highest population due to the more residential character of the corridors west of Grand Boulevard.	Good
3 Walnut	4,663	49,905	Includes much of the same area covered by the Grand Boulevard alignment; however, some of the Government District is not within its service area (e.g. the Bolling Federal Building, County Courthouse, and State Office Building), thus accounting for the slightly smaller employment numbers. In addition, this alignment is closer to the Convention Center and Kaufmann Center for the Performing Arts, making up for some of the employment loss.	Good
<b>4</b> Baltimore	4,893	46,832	Similar connections to activity centers and population as Main Street but has the lowest number of employees of any bidirectional alignment. It does not include the Government District or some large office centers south of the Sprint Center.	Good
5 Grand Walnut	4,380	48,403	The number of employees served is high but less than either Grand Boulevard or Walnut Street because parts of the Government District are not served nor some of the areas west of Walnut Street.	Good
6 Main Walnut	4,647	43,528	Combination of alignments along Main and Walnut Streets, but it does not directly serve the Government District. The overall character is more residential than Grand Boulevard.	Fair
7 Main Baltimore	4,893	46,516	Combination of alignments along Main Street and Baltimore Avenue. Does not directly serve the Government District and overall character is more residential than Grand Boulevard.	Good

**Conclusions:** There are no large differences in the number of residents and employees served (4,365 to 4,969 residents and 43,528 to 51,551 jobs). Grand Boulevard would serve the highest number of jobs because it provides the best service to the Government District.

**Notes/Source:** The analysis for the couplet alignments only considers the area that can be reached by both the northbound and southbound trips. When overlaying service area buffers from the bidirectional alignments to discover the couplet service area, only the area of intersection is fully served by the couplets. Data is from 2007 KCMO travel demand model (adapted from MARC).



Table T2:	Suppor			•	vent activit	ties	
		With	nin ¼ Mile of A Special	Number			
Alternative	Major Hotels	Hotel Beds	Event Venues	of Events	Attendance	Summary	Fulfills Objective
1 Grand	6	2,469	4	N/A	N/A	Close to the Sprint Center, Power & Light District, Union Station, and most of Crown Center. Has the lowest number of hotels and hotel beds because many area hotels are clustered around the Convention Center further west.	Fair
2 Main	8	3,474	6	N/A	N/A	Close to the Sprint Center, Power & Light District, Union Station, most of Crown Center, the Convention Center, and the Kaufmann Center for the Performing Arts. Is accessible to most hotels and a large number of hotel beds.	Best
3 Walnut	8	3,474	6	N/A	N/A	Includes much of the same area covered by the Grand Boulevard alignment. Also includes the Convention Center and Kaufmann Center for the Performing Arts, which accounts for the greater number of hotel beds. Is accessible to most hotels and a large number of hotel beds.	Good
4 Baltimore	8	3,474	6	N/A	N/A	This alignment has similar connections to activity centers as Main Street. Generally, no street closures currently along Baltimore Avenue. Is accessible to most hotels and a large number of hotel beds.	Good
5 Grand Walnut	6	2,469	4	N/A	N/A	Similar access to hotels and special event venues as the Grand Boulevard alignment, minus the Convention Center and the Kaufmann Center. Is accessible to most hotels and a large number of hotel beds.	Fair
6 Main Walnut	8	3,474	6	N/A	N/A	Similar to both the Main Street and Walnut Street alignments.	Good
7 Main Baltimore	8	3,474	6	N/A	N/A	Similar to both the Main Street and Baltimore Avenue alignments.	Good

**Conclusions:** All alignments serve hotels and special event venues well. However, alignments that utilize Grand Boulevard perform slightly worse because its service area does not include the Convention Center or the Kaufmann Center for the Performing Arts. Many major hotels are clustered around the Convention Center, which are not served by Grand Boulevard alignments.

**Notes/Sources:** The analysis for the couplet alignments only considers the area that can be reached by both the northbound and southbound trips. When overlaying service area buffers from the bidirectional alignments to discover the couplet service area, only the area of intersection is fully served by the couplets. Hotel information from 2007 KCMO travel demand model (adapted from MARC).



Alternative	Comments Expressing Support	Comments Expressing Concern	Fulfills Objective
ALL	Support for alternative that serves River Market.	Concern over terminus at southern end of alignment, especially if service extends south of Pershing Road.	
<b>1</b> Grand	Wide street with direct routing through downtown. Adjacent to major activity centers such as Sprint Center. Traffic congestion is not a concern.	Connection to Union Station is not direct. Would be affected by street closures.	Good
2 Main	Street is straight and fairly wide, offers centralized line and logical choice through center of downtown. Equidistant to Convention Center, Power & Light and Sprint Center. Would be easy to extend service to the Plaza.	Traffic congestion may be problem at intersection with 11th Street. MAX already on Main Street.	Best
3 Walnut	Attractive street with flat profile. Offers connections to Power & Light and Crossroads and still close to Sprint Center. Good access to River Market.	Corridor is fairly narrow; may have difficulty accommodating additional transportation service. Also subjected to street closures.	Good
4 Baltimore	Offers connections to downtown residential areas and convention hotels.	Considered too far west. Corridor is fairly narrow. Bypasses many of the major activity centers, such as Power & Light and Crossroads.	Good
5 Grand Walnut	Creates more street walking and street traffic to support economic development. Offers benefit to wider group of people	Issues reflect general concern over using couplets (i.e. higher costs, more difficult to understand, and diluting development potential).	Fair
6 Main Walnut	Less interference with events at Sprint Center and street closures. Offers direct connections to major activity centers.	Issues reflect general concern over using couplets (i.e. higher costs, more difficult to understand, and diluting development potential).	Fair
7 Main Baltimore	Equidistant from Spring Center and Performing Arts Center/Convention Center. Works around disruptions associated with Sprint Center events.	Issues reflect general concern over using couplets (i.e. higher costs, more difficult to understand, and diluting development potential).	Fair

**Conclusions:** All alternatives had supporters. Main Street received the strongest and most consistent stakeholder and community support, largely due to its central location and access to activity centers. Grand Boulevard had strong support but also received more negative comments as compared to Main Street. Couplet alternatives were generally less well perceived, primarily due to concerns over service design rather than alignment.

Notes/Source: Comments represent public and stakeholder opinion. Data drawn from stakeholder interviews and public comment received at June 21, 2011 Public Open House.



# Regional Alternatives Analysis:

### Table S1A: Develop cost-effective transit solutions; improve effectiveness and efficiency of existing transit service **Alternative** Summary **Fulfills Objective** Most bus service between Crown Center and the Financial District now operates on Grand Boulevard. With Downtown Corridor service, most or all bus service could be shifted to Main Street where it could share existing MAX facilities (bus lanes and stations). Alternatively, Grand Boulevard could be developed as the corridor's primary transit street, with both streetcar/enhanced bus and most or all Good local bus service. Synergies between the Downtown Corridor and Grand Boulevard Streetscape projects could reduce costs. In either case, transit facility improvements would be focused on Grand Boulevard and few, if any, infrastructure improvements would be made on other streets. With Downtown Corridor service on Main Street, it would likely be desirable to shift Main Street MAX service to Grand Boulevard. Bus facility improvements (bus lanes, stops/stations, etc.) could be implemented on Grand Boulevard as part of the Grand Boulevard Streetscape project. In this case, significant transit service improvements would be implemented on both Main Street and Grand Good Boulevard. The development of streetcar service on Main Street and the shifting of Main Street MAX would provide strong transit spines on each of the corridor's two major north-south streets. There would be few compelling reasons to shift existing north-south bus services from either Main Street or Grand Boulevard to Walnut Street as it would likely be slower and a block away from higher Fair activity centers. Thus, there would be fewer potential synergies between Downtown Corridor and local bus service. With Downtown Corridor service on Baltimore Avenue, it is likely that Main Street MAX service would remain on Main Street, as Main Street provides for faster service, which is a key element of MAX service. As a result, the corridor's two premium services would be located only one block apart. Therefore, they would compete with each other, perhaps more than they would complement each other. It Fair would also mean that the two premium north-south services would be focused on the western side of the corridor, which would provide less service coverage than other Downtown Corridor/Main Street MAX combinations. Similar to Alternative 1 (Grand Boulevard), except that Grand Boulevard would become a transit spine to a lesser extent than with Alternative 1 because streetcar service would be split between Grand Fair Boulevard and Walnut Street. Similar to Alternative 2 (Main Street), except that Main Street would become a transit spine to a lesser extent than with Alternative 2 because streetcar service would be split between Main Street and Fair Walnut Street Similar to Alternative 2 (Main Street), except that Main Street would become a transit spine to a lesser extent than with Alternative 2 because streetcar service would be split between Main Street and Fair Baltimore Avenue.

Conclusions: Alternative 1 (Grand Boulevard) provides the best potential for efficient downtown transit service as it (1) offers the opportunity to develop strong transit spines on both of the Downtown Corridor's major north-south arterials (Main Street and Grand Boulevard) and (2) creates possible synergies with the Grand Boulevard Streetscape project. However, it would not provide direct connections at the 10th & Main Transit Center. Alternative 2 (Main Street) provides the second best potential for the strengthening of the overall downtown transit system as it (1) offers the opportunity to develop strong transit spines on both of the Downtown Corridor's major north-south arterials (Main Street and Grand Boulevard) and (2) would provide direct connections at the 10th & Main Transit Center.

Notes: KCATA, as part of its CSA efforts, desires to rationalize bus circulation to, from, and through the Financial and Government Districts and plans to orient the reconfiguration around the selected Downtown Corridor alignment. All alignments would provide for the development of a more efficient reconfiguration of Financial and Government District bus service. All alignments could also provide for the conversion of some bus service that operate through the corridor (originating from the north or south) to terminate at the ends of the Downtown Corridor service, with continuing service then provided by the streetcar/enhanced bus.



Alternative	Annual Partial Day Street Closures	Annual Full Day Street Closures	Summary	Fulfills Objective
<b>1</b> Grand	5	16	There are a significant number of street closings on Grand Boulevard in front of the Sprint Center that are associated with Sprint Center events. These include partial day closures to help control pedestrian circulation to large events where the street is shut down during the event and for a short duration before and after, and full day closures that can last for several days at a time. (For the six month periods between March and August 2011, there were 5 partial days closures and 16 days of full day closures). During these times, if streetcar service were to operate through the street closure section, there would almost certainly be delays, although these delays could likely be managed. Enhanced bus service would detour around the street closures, which would add a few minutes to running times.	Fair
2 Main	0	0	Through the Financial District, Main Street has two travel lanes in each direction. South of 10 <sup>th</sup> Street, parking is prohibited, but north of 10 <sup>th</sup> Street, it is permitted during off-peak periods. This creates a minor choke point in this area. If on-street parking were maintained, there could be some minor delays.	Good
3 Walnut	7	0	South of the loop, Walnut Street is one-way northbound with two lanes of traffic and parking on both sides. With two-way Downtown Corridor service, either the left-most lane would need to be converted to a southbound transit lane, or alternatively, the street could be converted to two-way operation. In any event, traffic volumes are light, and reliable operation could be expected. Within the loop, Walnut Street has three to four travel lanes, and with the exception of a two block section between Truman Road and 12 <sup>th</sup> Street, is also one-way northbound. However, using similar measures as described for south of the loop, reliable service could be provided. Walnut Street has 7 partial day street closures due to events at the Power & Light District. During these times, if streetcar service were to operate through the street closure section, there would almost certainly be delays, although these delays could likely be managed. Enhanced bus service would detour around the street closures, which would add a few minutes to running times.	Fair
4 Baltimore	1	0	South of 12 <sup>th</sup> Street, Baltimore Avenue is two-way with one lane of traffic in each direction and parking on both sides (some of which is back-in angle parking). Traffic volumes are light, and reliable operation could be expected. North of 12 <sup>th</sup> Street, Walnut Street is one-way with two northbound travel lanes and parking on each side. With Downtown Corridor service, either the left-most lane would need to be converted to a southbound transit lane, or alternatively, the street could be converted to two-way operation. In any event, reliable operation could be expected.	Good
5 Grand Walnut	12	16	With Grand Boulevard/Walnut Street service, it would be desirable for northbound service to operate on Grand Boulevard and southbound service to operate on Walnut Street (since Americans are used to right-hand side operations). This would require at least one lane of much of Walnut Street to be converted to southbound operation, and reliable service could be provided throughout the corridor.	Fair
6 Main Walnut	7	0	With Main Street/Walnut Street service, northbound service would most likely operate on Walnut Street and southbound service on Main Street. Service could be operated reliably on both streets.	Fair
7 Main Baltimore	1	0	With Main Street/Baltimore Avenue service, it would be desirable for northbound service to operate on Main Street and southbound service on Baltimore Avenue. This would require at least one lane on Baltimore Avenue between 10 <sup>th</sup> Street and 12 <sup>th</sup> Street to be converted to southbound operation, and reliable service could be provided throughout the corridor.	Good

**Conclusions:** On a day-to-day basis, all alignments would provide for reliable service. The most significant exception would be Grand Boulevard, where there would be conflicts between Downtown Corridor service and Sprint Center special events, and which would likely produce delays during those times.

**Notes/Source:** There are a number of special events at Crown Center during which Grand Boulevard is closed south of Pershing Road. As long as Downtown Corridor service does not extend south of Pershing Road, none of these events would impact Downtown Corridor service to a significant extent. Data is from Kansas City Convention & Visitors Association for 2011.



Table S2: Co	nvert surface pa	rking to higher value uses	
Alternative	Acres of Surface Parking Within ¼ Mile	Summary	Fulfills Objective
1 Grand	95.6	Includes free surface lots between Cherry/Locust and 10th/11th. However, this has since been developed into the JE Dunn Construction World Headquarters. Highest amount of surface parking among the bidirectional alternatives.	Best
2 Main	86.1	Access to some free surface lots that Grand Boulevard and Walnut Street alignments do not have. Parcels seem large enough for development potential.	Fair
3 Walnut	89.1	Does not provide any particular benefit in terms of access to surface parking. Lowest acreage of surface parking among all alternatives.	Good
4 Baltimore	88.6	Includes several smaller free surface lots towards southern end of the alignment but most seem too small for substantial development potential. Lacks access to large paid lot that other alignments have (on Locust between 19th and 20th).	Good
<b>5</b> Grand Walnut	103.1	Couplet alignment expands the influence of the alignment to a greater area, capturing the surface lots in both the Grand and Walnut bidirectional alternatives. Highest acreage of surface parking among all alternatives.	Best
6 Main Walnut	94.8	Couplet alignment expands the influence of the alignment to a greater area, capturing the surface lots in both the Main and Walnut bidirectional alternatives.	Good
<b>7</b> Main Baltimore	89.8	Couplet alignment expands the influence of the alignment to a greater area, capturing the surface lots in both the Main and Baltimore bidirectional alternatives.	Good

**Conclusions**: The couplet alignments have greater potential to convert surface parking to higher uses than their component streets individually due to a larger influence area. There is a greater concentration of surface parking in the eastern areas, which give alternatives utilizing Walnut and Grand greater potential for redevelopment. Alternative 1 (Grand) and Alternative 5 (Grand and Walnut) provide the greatest potential to convert surface parking into higher value uses.

Notes/Source: Square footage of garage parking was excluded from the calculation of surface parking. Data from Jackson County Assessor GIS database.



Table S3: Im		utilities and t	their potentia	l need for modification or relocation	
Alternative	AT&T	Verizon/MCI	Utility Score	Summary	Fulfills Objective
1 Grand	1 <sup>st</sup>	2 <sup>nd</sup>	360	Least amount of utility impacts of all alignments because there are few storm sewer, communication line, and steam/chilled water impacts.	Best
<b>2</b> Main	2 <sup>nd</sup>	$4^{ m th}$	391	Least amount of water, sanitary sewer, and gas utility impacts but a very high impact on communication lines. A large duct line containing numerous communication lines for multiple companies exists along Main Street.	Good
3 Walnut	3 <sup>rd</sup>	$3^{\rm rd}$	419	Highest amount of utility impacts of all bidirectional alignments because of high impacts on sanitary sewer, storm sewer, combined sanitary and storm sewer, and gas utilities. However, small impact on electric lines.	Fair
4 Baltimore	$3^{\rm rd}$	1 <sup>st</sup>	417	High impacts on water, sanitary sewer, and steam/chilled water utilities. Least impact on combined sanitary and sewer utilities.	Good
5 Grand Walnut	-	-	779	Combination of Alternatives 1 and 3. Moderate impact among the couplet alignments.	Fair
6 Main Walnut	-	-	810	Combination of Alternatives 2 and 3. Highest utility impact among all alignments.	Fair
7 Main Baltimore	-	-	719	Similar to Alternatives 2 and 4, although not a simple addition of the two alignments. Lowest impact of all coulet alignments.	Fair

**Conclusions**: Alternative 1 (Grand Boulevard) has the least amount of utility impacts, while Alternative 2 (Main Street) is the second best. Walnut Street will have the highest number of utilities requiring potential modification or relocation, although Baltimore will have a similar number. The couplet alignments with have the highest impact on utilities because the streetcar/enhanced bus will operate on two streets.

**Notes/Source**: AT&T and Verizon/MCI did not provide documentation of the location of their utility lines, instead providing rankings of their preferred alignments. They did not rank the couplet alignments, primarily focusing on the impacts along individual streets. The size and location of each utility located along an alignment was considered when scoring. The utilities examined include water, sanitary sewer, storm sewer, combinded sanitary and storm sewer, gas, steam/chilled water, electric, and communications. Overall, lower scores correspond to lower impacts due to a smaller amount, smaller lines (pipes), and/or a better location.





### RIDERSHIP FORECASTING SUMMARY

### **Introduction**

The purpose of this technical memorandum is to document the methodology and results of the ridership forecasting effort undertaken to support the evaluation of alternatives for the proposed premium circulator services in Kansas City's Downtown Corridor. Figure 1 shows the study area and the alternative alignments along Main Street and Grand Boulevard. The ridership forecasting effort analyzed these two corridors both for enhanced bus circulator and streetcar modes. Currently Kansas City Area **Transportation** Authority (KCATA) operates MAX-BRT service along the Main Street Alignment. For the Main Street enhanced bus and streetcar alternatives, it has been assumed that the existing Main Steet MAX would be re-routed to Grand Boulevard within the study area.

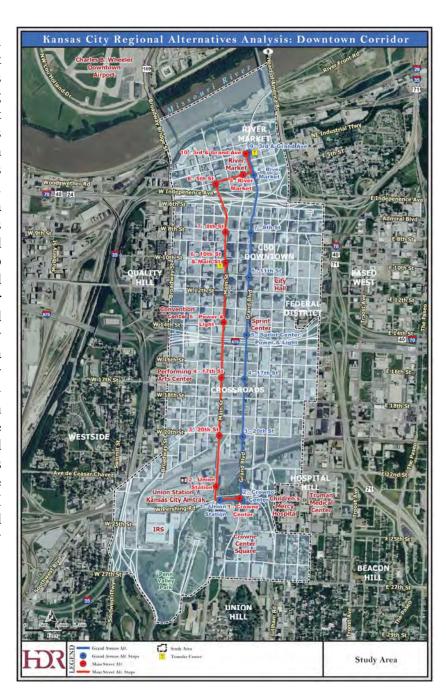


Figure 1 – Study Area and Alternative Alignments

### Methodology

Transit ridership for a given route depends on various factors including socio-economic characteristics, site conditions, transit supply variables, stop locations, etc. A sketch-level direct-demand model was developed for the Kansas City AA in order to observe the relationship of these variables with transit ridership and develop an instrument that can be applied to predict ridership for future conditions. The underlying assumption is that observed transit usage in the area is an indicator of future transit usage. Multivariate regression analysis was conducted using existing ridership data obtained from KCATA and socioeconomic data extracted from the Mid-America Regional Council (MARC) regional travel demand model in order to develop a linear functional form that expresses ridership as a function of population, employment, and hotel-motel rooms within quarter mile of the project alignment. Peer system ridership characteristics and fixed guideway credits associated with unmeasured variables were utilized to develop mode specific coefficients. Figure 2 shows the overall model development and application process.

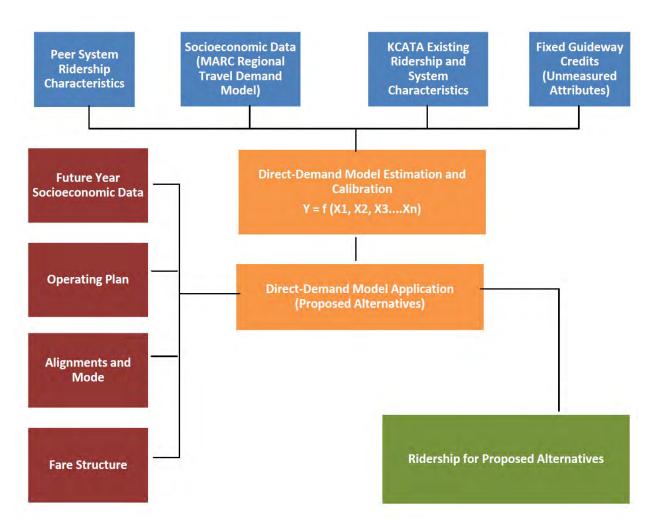


Figure 2 - Direct Demand Modeling Methodology

### **Results**

Once developed, the model was applied for the alternative alignments for enhanced bus circulator and streetcar modes in order to generate opening year (2015) and horizon year (2035) riderships for a typical weekday (refer to Table 1). The ridership forecasts are developed for various land use scenarios developed by the project team considering economic development impacts of the proposed alignments and modes. The intent is to capture the uncertainties associated with future development in the corridor in evaluating ridership potential of the proposed circulator. The opening year (2015) ridership potential of the alignments are compared to the existing peer systems in Figure 3. Table 2, at the end of this memo, includes stop-level ridership estimates.

**Enhanced Bus Circulator Streetcar Circulator MARC Streetcar Landuse Enhanced Bus MARC Alternatives** Landuse **Moderate Growth High Growth** Landuse Landuse **Opening Year 2015 Main Street Alignment** 1,246 1,287 2,896 2,817 **Grand Blvd. Alignment** 1,183 1,144 2,662 2,584 **Horizon Year 2035 Main Street Alignment** 2,677 2,681 6,023 6,220 6,928 **Grand Blvd. Alignment** 2,465 2,442 5,547 5,655 6,271

Table 1 – Opening Year (2015) and Horizon Year (2035) Daily Ridership

Assumptions: Hours of operations – 6 am to 10 pm on weekdays; Headway of the proposed enhanced bus and streetcar = 10 minutes peak, 15 minutes off-peak; Fare structure – same as existing KCATA fare structure

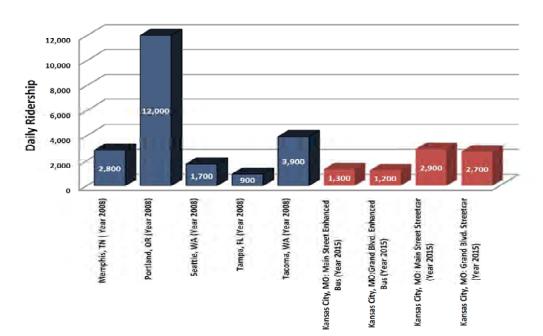


Figure 3 – Opening Year Ridership Comparison with Existing Peer Systems

# Regional Alternatives Analysis:

The analysis reveals that the ridership of the streetcar mode would be substantially higher as compared to the ridership of the enhanced bus mode for both Main Street and Grand Boulevard alignments. Also, the Main Street alignment would perform marginally better than the Grand Boulevard alignment from a ridership perspective. It is important to mention that the ridership forecasts are conservative in the sense that event related riders have not been adequately captured in this analysis. A large event related transit ridership market exists in the study area which was not analyzed due to the lack of readily available data. Several private charter and shuttle buses currently serve the event partons traveling between hotels and venues. The ridership of the proposed system may increase substantially depending on how these event related transit services are configured with the project in place. Similarly, some of the KCATA local bus routes may be modified to feed the circulator system as opposed to providing competing services. These opportunities will be further investigated and analyzed in the subsequent phase of the project, as needed. The reader must also note that the sketch-level ridership forecasts were not developed to satisfy FTA New Starts/ Small Starts requirements, additional analysis will be required following FTA forecasting guidelines if FTA Section 5309 funds are pursued.

# Table 2 - Stop-Level Opening and Horizon Year Ridership Forecasts

			Opening Year 2015	15				Horizon Year 2035	385	
	Enhanced Bus Circulator	15 Circulator		Streetcar Circulator		Enhanced Bus Circulator	us Circulator		Streetcar Circulator	
Grand Avenue		Enhanced Bus		Streetcar Landuse	anduse		Enhanced Bus		Streetcar Landuse	anduse
	MARC Landuse	Landuse	MARCLanduse	Moderate Growth	High Growth	MARC Landuse	Landuse	MARC Landuse	Moderate Growth	High Growth
3rd & Grand	24	26	53	09		41	69	92	169	219
River Market	19	71	43	47		34	54	11	132	168
North Loop	171	154	384	348		421	330	948	773	887
Gov't District	310	295	869	599		658	809	1,482	1,403	1,545
Sprint Center/Power & Light	222	201	200	455		542	442	1,219	1,021	1,124
Crossroads North	49	48	111	109		102	102	229	239	273
Crossroads	64	55	143	146		112	135	252	310	340
Crossroads South	115	117	258	264		193	242	435	553	589
Crowne Center	132	138	297	311		223	291	503	599	702
Union Station	17	62	174	179		139	170	312	390	425
Total	1,183	1,144	2,662	2,584		2,465	2,442	5,547	5,655	6,271

	Contract Contract		Opening Year 2015	15		The second lives		Horizon Year 2035	035	
1 10	Enhanced Bus Circulator	15 Circulator		Streetcar Circulator		Enhanced Bus Circulator	us Circulator		Streetcar Circulator	
Main street		Enhanced Bus		Streetcar Landuse	anduse		Enhanced Bus		Streetcar Landuse	anduse
	MARC Landuse	Landuse	MARCLanduse	Moderate Growth	High Growth	MARCLanduse	Landuse	MARC Landuse	Moderate Growth	High Growth
3rd & Grand	21	24	47	26		36	71	82	177	237
City Market	13	14	28	31		23	39	52	. 6	128
River Market West	22	26	50	90		40	78	68	194	262
North Loop	126	113	283	257		318	247	714	582	682
Financial District	218	205	491	494		492	428	1,106	1,002	1,145
Financial District South	334	317	751	716		704	099	1,584	1,508	1,594
Convention Center/Power & Light	117	101	264	227		305	212	685	479	487
Kauffman Center	38	37	86	85		77	80	174	188	219
Crossroads	64	65	143	146		112	137	252	317	353
Freighthouse	114	118	256	266		189	247	426	570	625
Union Station	89	69	153	157		120	150	271	348	390
Crowne Center	153	156	344	353		261	332	588	758	806
Total	1,287	1,246	2,896	2,817	4	2,677	2,681	6,023	6,220	6,928



### **Economic Development Factors** Tier 2 Screening

### Introduction

This Technical Memorandum presents various information regarding land use, population, economic activity and development to assist in determining which of the two alignments (Main Street vs. Grand Boulevard) may be the better choice for the LPA. Five types of information are presented:

### 1. Definition of Study Area and Concepts

This section provides background on the specifics of the study area that will be examined for comparson between the two alignment alternatives and defines basic concepts and information about the two areas. The "alignment influence zones" for each alternative are based on a reasonable "walking radius" (generally ¼ mile).

### 2. Present Levels of Activity and Development Trends:

This information helps provide a comparison as to whether one route or the other better serves existing users and uses from Opening Day. It intends to help answer the question: "If there is only the prospect for limited or slow growth over the next decade or so, does one route emerge as better serving existing levels of activity?" The information was xtracted, mapped and aggregated from 2000, 2010 Census, MARC 2005-2040, Assessor's data base, retail sales, development project lists and other sources to determine existing (2010) status within certain distances of each alignment; past growth trends in those areas, and to create various projections going forward.

### 3. Capacity for Future Economic Development:

This part of the analysis compares the potential "holding" capacity of sites within the "influence zone" of each alignment and evaluates whether either alternative is likely to "run out" of sites in the near to intermediate term under a variety of growth assumptions. Using detailed parcel data from Assessor's database and City's GIS system, zoning and land use plan information, as well as real estate value data, determined potential currently unused additional development (buildout) capacity for each alignment alternative, including development/redevelopment of vacant or underdeveloped sites; or infill/reuse of larger vacant buildings. Based on past and possible future development trends, estimated minimum number of years until "buildout" might be reached.

### 4. <u>Projection of Upside Economic Development Potential over 1<sup>st</sup> 15 years:</u>

A scenario is presented comparing the two alignments in terms of the maximum likely economic development impact in each corridor related to the implementation of a streetcar. This scenario implies that the overall level of regional economic activity increases and the draw to the center of the region (and a particular alignment) is optimally accelerated<sup>1</sup>. These are "upper end" projections of the maximum amount of physical development and real estate value added that might be generated over first 15

<sup>&</sup>lt;sup>1</sup> Assumes strong regional growth and that many, if not all, of the incentives used in the past (e.g. tax abatement, Historic and Low Income Tax Credits for housing, and other tools for commercial development), remain in place.



years from project start. This scenario only applies in the case of the streetcar alternatives, as there is little national evidence, on any quantitative basis, that BRT accelerates economic development along a corridor. In those cases the current projections of the regional transportation model may be as useful as any others.

### 5. On the Ground Reality Check: Qualitative Factors

Provides a summary of additional information gathered from interviews with members of the Downtown business and real estate communities as to their perspectives on downtown development and factors that might affect choice of alignment.

### **Definition of Study Area and Concepts**

Maps 1 through 3 below define the entire study area, the area of interest surrounding Main Street, and the area of interest surrounding Grand Boulevard, respectively.

Map 1: Entire Study Area



**Map 2: Main Street Alternative** 







These two alignment alternatives serve four main areas within the downtown. From north to south, these are the River Market, the Downtown Loop, Crossroads, and the Crown Center/Union Station area. Each of these three areas is zoned for mixed use, with the Downtown Loop and Crown Center area being zoned as "Downtown Core" and the River Market and Crossroads being zoned as "Downtown Mixed Use." Downtown core zoning is intended to promote high-intensity office and employment growth within the downtown core areas, recognizing that it is a hub for businesses, communications, retail, cultural, visotr accommodations, and entertainment uses while also accommodating residential development. Downtown mixed use zoning is intended to accommodate a large variety of uses from office to institutional to residential, while promoting a mix of land uses both horizontally and vertically.<sup>2</sup>

<sup>&</sup>lt;sup>2</sup> "Greater Downtown Area Plan", prepared for the City of Kansas City, Missouri by the COR Team.

An additional factor that distinguishes this analysis from the Tier 1 Screening is the distinction between conditions at varying distances from the alignment. Three different zones were considered for examination: directly on the alignment/1 block, within 2 blocks, and within 3 blocks. A streetcar is likely to have a larger impact on the parcels that are directly on the alignment than the parcels farther away.

### **Present Levels of Activity and Growth Trends**

Table 1 and Maps 4 to 7 compare the two alignments based on a number of key variables that lead to potential ridership generation and can also lead to increased levels of activity due to the provision of improved local transit service (for example – visits to performing arts centers or elevated retail sales volumes due to higher tourist presence).

The data suggest that the Main Street alignment would serve more of the existing resident population and economic activity centers than would the Grand Boulevard alignment. As shown in Table 1, Main Street exceeds Grand Boulevard by 10% or more in many of the key past and present day variables measured, whereas Grand Boulevard outperforms Main Street by 10% or more on only 1 of the key variables (non-residential commercial space growth over the past ten years).

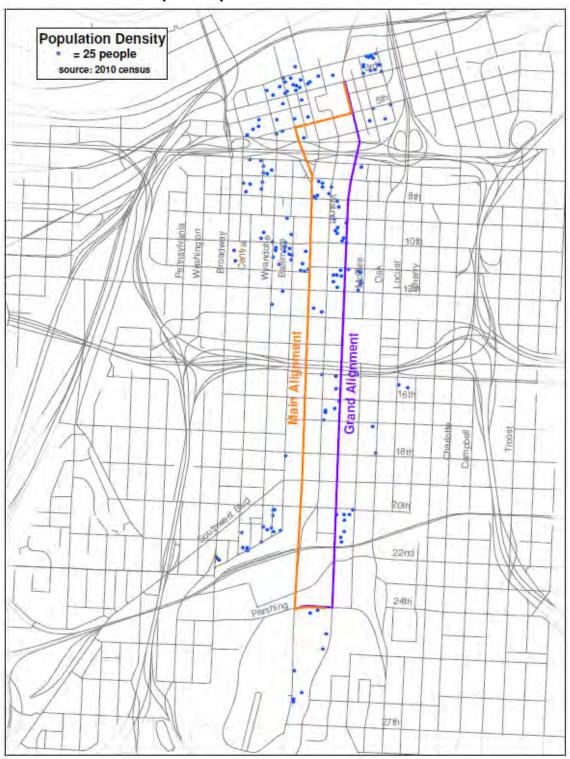
With respect to growth trends, Main Street might be the better choice in the event that the presence of transit (whether BRT or streetcar) DOES NOT result in a shift in future growth patterns within the Downtown area in general.<sup>3</sup> This is because, over the past ten years, total added residential development in the Main Street alignment has exceeded that added in the Grand Boulevard influence zone by 35 percent. This significantly outweighs the amount of added non-residential commercial development, which while favoring Grand Boulevard by 15 percent, accounts for a much smaller incremental addition of square footage and value, less than half of the residential base total.

Economic Development Factors – Tier 2 Screening Page 6

<sup>&</sup>lt;sup>3</sup> Use of various economic incentives and development tools (such as public sites and tax increment financing, Historic and Low Income Tax Credits, tax abatement, etc) have been major factors in influencing the level and location of downtown development over the past decade. The "Highest" end projections assume that these tools would continue in place.

Table 1: Comparison of Existing Co	nditions and Curre	ent Growth Trend	ls		
ITEM	Study Area	Main Street Line	Grand Blvd. Line	Preference	e to: (1)
				Main	Grand
Existing Conditions: 2010					
Population (Census 2010)	4,609	4,596	3,628	1	
Within 2 blocks		3,130	2,216		
Housing Units (Census 2010)	3,880	3,867	3,061	1	
Within 2 blocks		2,663	1,804		
Employees (TAZ 2005)	65,602	52,320	50,056	0	(
Within 2 blocks		27,220	25,880		
Hotel Rooms		3,474	2,469	1	
Within 2 blocks		2,469	1,460		
Venues - Annual Attendance	5.7 million	5.7 million	3.3 million	1	
Number	14	14	11		
Retail Sales (within 1 block)		\$93 million	\$97 million	0	
Eating and Drinking Only		29 million	29 million		
Market Value	\$1880 million	\$1590 million	\$1570 million	0	
Within 1 block		490 million	390 million		
Within 2 blocks		890 million	770 million		
Growth Trends: 2000 - 2010					
Population Growth (from Census)	3,017	3,123	2,737	1	
Per year	302	312	274		
Housing Units (Census 2010)	2,513	2,513	2,174		
(Project List)	3,200	3,200	2,369	1	
Per year	251 to 320	251 to 320	217 to 237		
Non Residential Growth (sf) (Project List)	1,467,207	1,281,752	1,467,207	0	
Per year	146,721	128,175	146,721		
Growth Projections (TAZ 2005-2040)					
Employment	32,369	30,784	31,380	0	
Per year	925	880	897		
Households	6,263	5,935	4,851	1	
Per year	179	170	139		
Number of Times Line is Better by 10% or More based on the Variable (1)				7	
Notes:					

Notes:
(1) Compares the variable being measured between the two lines. If one line exceeds the other by 10% or more it gets a 1; otherwise a 0. Sums all the Ones at bottom of page.

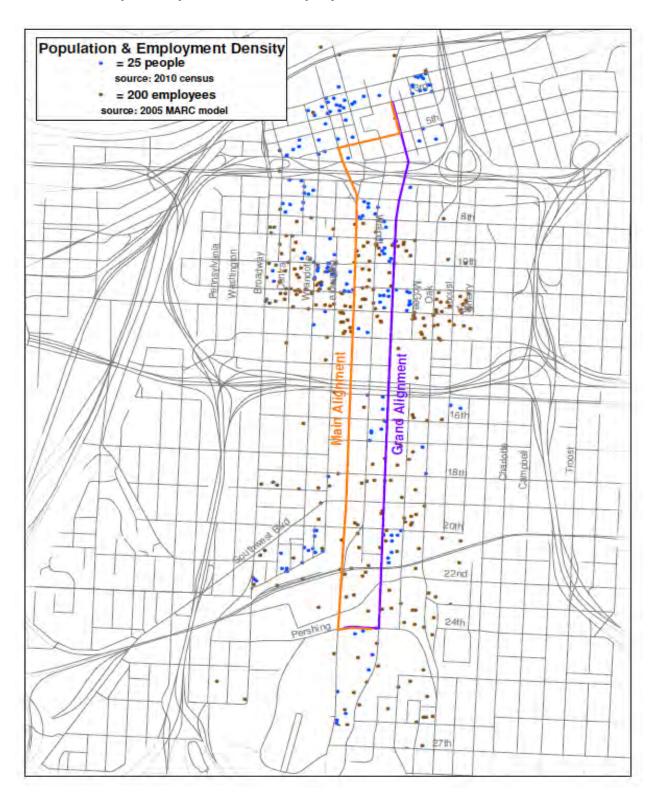


Map 4: Population Distribution - 2010 Census

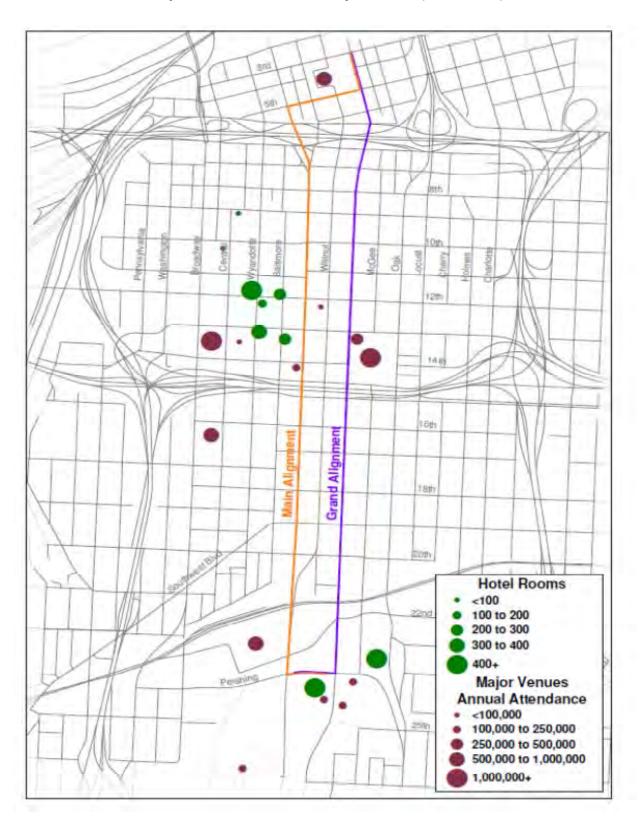
Map 5: Employment Distribution - 2005 TAZ Data



Map 6: Population and Employment Distribution Combined



Map 7: Hotels and Activity Centers ("Venues")



### **Capacity for Future Growth**

Both alignments were compared to test for substantial differences in potential for future development and to see if potential development along either alternative would be greater than capacity limits in the near future. Two types of sites were considered: vacant or underutilized sites, those with no building or a very small building on a large parcel; and vacant buildings.

Using very conservative calculations<sup>4</sup>, Table 2 below indicates that both alternatives seem to offer very similar capacity for future development – approximately triple current residential capacity and a more than 50 percent increase in non-residential capacity.<sup>5</sup> The most aggressive absorption scenario imaginable is a doubling of the annual rate of residential building along a given corridor relative to growth in the past ten years. Even under these conditions, there is enough residential capacity to last at least thirteen years at the current, relatively modest, buildout densities. Long before this capacity constraint were to be reached, developers would build at an increased density that still meets the zoning regulations. This would significantly extend the buildout life of the given corridor. Additionally, the zoning for the areas along the alignments is for mixed use, so sites that would otherwise be assumed to be allocated for one use could be used for another use. Given these conditions, neither alignment seems to suggest any particular advantage from the buildout capacity viewpoint.

Table 2
Projection of Medium Term Development Capacity of Alignment Alternatives
(assuming a streetcar is built)

	Main Str	eet Line	Grand B	lvd Line
	Residential (Units)	Non-Res (SF)	Residential (Units)	Non-Res (SF)
Development Capacity- "Medium Term"	8,474	6,561,368	8,451	6,297,955
"Baseline" Capture Rates: (annual)	320	128,175	240	146,721
Moderate:				
Average Annual Absorption	384	134,584	288	154,057
Years to Absorb:	22	49	29	41
High:				
Average Annual Absorption	640	166,628	480	190,737
Years to Absorb:	13	39	18	33

a. **Moderate** = residential development that is equal to 120% of average per year of last 10 years in the corridor; and employment that is 105% of that average.

b. **High** = residential development that is equal to 200% of average per year of last 10 years in the corridor; and employment that is 130% of that average. This number is quite aggressive and should assume the continuance of many of the existing economic development incentives and tools, at least in the first 5 + years until the trend proves itself.

<sup>&</sup>lt;sup>4</sup> In calculating "medium term" buildout capacity (i.e. next 15 to 30+/years) it is assumed that some percentage of parcels potentially available for development (e.g. vacant or underutilized lots) will not, in fact be available over that time period, due to any number of factors such as existing legal agreements, size, use, etc. In addition, when significant unused capacity exists (as it will in early years at least) and the market is soft, many parcels can be expected to build out at substantially less than their theoretical legally allowed zoning capacity, due to the lesser cost of stick construction and use of surface parking or simple decks in a low land value scenario (relative to incremental construction costs for the more dense construction). As parcels begin to build out, prices rise and more come on the market and build out tends to occur at higher densities, extending the time period until true buildout is actually approached. In fact, in very few US downtowns is true buildout ever reached.

### **Projection of Upside Economic Development Potential over 1st 15 years**

Table 3 compares the <u>maximum</u> likely "add" to total market value (in 2010 uninflated \$) of all non-governmental and non-institutional property within each of the two alignments over the 15 years after a streetcar is fully funded and commences construction. In this case, only the streetcar is considered because there is no statistical, or justifiable anectodatal evidence, that BRT either accelerates property development or property values in the corridors or locations with which it might be associated.

The streetcar maximum "value" add scenario is the sum of value added by continuation of existing "baseline growth" (the annual rate of development over the past ten years), plus maximum assumed additional growth induced by streetcar in the given corridor, plus a one time three percent increase in the value of all property in the given corridor. The increase in property value is due to the transportation and proximity benefits of the streetcar, as seen in comparison cities, and will be realized over approximately three to seven years after the commencement of construction on the line. Applying the highest projected growth assumptions equally to each corridor, a streetcar could potentially add up to \$110 million more in value and development in the Main Street corridor than in the Grand Boulevard corridor, as shown in Table 3. The amounts induced by streetcar range from a 70 percent add over and above baseline development in Grand Boulevard corridor to an 77 percent add over baseline growth in the Main Street Corridor.

Table 3: Comparison of Maximum Projected Increase (Streetcar Only; Not BR		e in Next 15 Year	rs
	Study Area	Main Street Line	Grand Ave Line
Existing Conditions: 2010			
Market Value	\$1880 million	\$1590 million	\$1570 million
Economic Development Potential (Calculated)			
Maximum Upside Value Added Projection: (15 Years) (1)			
Value Added by Baseline Growth		\$769 million	\$690 million
Value Added by Streetcar Induced Growth and Premium at 3% on 1st 2 blocks		\$593 million	\$482 million
Total Value Added in 15 Years		\$1362 million	\$1172 million
Notes:			

(1) Estimate of maximum potential upside results under extremely favorable assumptions: first, that annual baseline economic growth over next 15 years equals the average achieved in the past decade - so "baseline growth" applies past annual absorption rates to housing at \$100,000/unit and non residential at \$150/sf. added to the existing market base (net increase over existing land values). Second, maximum growth induced by streetcar (within the streetcar influence zone) is the "high" absorption scenario increment shown in Table 2 times the unit prices; plus a one time average 3% assumed increase in the market value of all property within 2 blocks of the streetcar line. (This value "bump up" would probably occur within 3 to 7 years of line construction starting).

### **Qualitative Factors**

A series of interviews were conducted with downtown real estate and economic development stakeholders. These stakeholders are from public, quasi-public and private entities and are active in the downtown real estate development market. The purpose of the interviews was to gain a better understanding of the main market dynamics within downtown and how enhanced transit might factor into the equation. While the stakeholders provided varied insight, a few key points were made by most or all of the interviewees. These key points are briefly summarized below under three main categories. It is important to note that the summary below is a compendium of opinions of those interviewed and may or may not be consistent with the overall findings of this report.

- 1. The performance and outlook for various market sectors within downtown
  - a. <u>Residential</u> development has increased significantly in downtown over the past decade. Adaptive re-use of existing buildings has accounted for most of this development. Nearly all projects have received some sort of subsidy, most notably through the use of historic preservation tax credits. Development has occurred primarily in the central and western corridors. While the for sale (condominium) market has largely disappeared, there remains some demand for rental residential units. Tight credit markets are making it difficult for new projects to meet this demand.
  - b. The downtown office market is very challenging. Vacancy rates are high and it will be several years before this supply is absorbed. Consequently, downtown rents are being driven low by the competition for a very limited pool of tenants. Additionally, competition with suburban markets, particularly those in Kansas where significant state incentives are being offered, is drawing office users away from downtown. Kansas City, MO has not been able to match the incentives offered in Kansas. With the possible exception of the occasional single tenant, build-to-suit project, new office development in downtown is highly unlikely in the near term.
  - c. Retail and entertainment uses have significantly increased in the downtown area. The Power and Light District and Sprint Center are the major components of this trend. These projects and other smaller projects have changed the perception of downtown and made it more of a destination. Despite some success with these developments, an additional downtown population base is needed to add additional and more varied retail.
  - d. The downtown <a href="https://example.com/h
  - e. The cost of providing <u>parking</u> (generally structured) negatively affects the feasibility of projects downtown.

- 2. The potential role of enhanced transit such as streetcar in the downtown market
  - a. Streetcar service would make residential development more attractive, but would not significantly reduce the level of subsidy required for new projects.
  - b. Similarly, retail uses could benefit from the increased mobility offered by streetcar, but it does not seem that streetcar itself would significantly increase the level of retail development. More residents are needed downtown for more retail.
  - c. Streetcar service is not likely to have a significant affect on the office market.
  - d. Streetcar service could potentially benefit the visitor/entertainment/hotel market the most, but it is unclear if it would be enough to significantly improve the level of activity in these sectors.
- 3. The relative merit of the Main Street and Grand Avenue alignments
  - a. In general, the interviewees believed that either alignment could work, that both were attractive options and that the overall differences between the two potential alignments were slight.
  - b. Nonetheless, there was a general perception that Main Street had more overall support and was the slightly better option.
  - c. More specific comments that were commonly mentioned:
    - The Main Street alignment was seen as having significant development momentum already and therefore some believed the project would have more significant positive impact along Grand Avenue.
    - ii. Grand Avenue could present the easier option from a constructability and cost perspective due to its greater width.
    - iii. The Grand Avenue line was seen as problematic due to:
      - 1. Opposition by the Cordish Group to the project going by their front door
      - 2. Complications with the need to close Grand Avenue for various major events throughout the year.
      - 3. The greater distance from the convention center and hotels along Wyandotte Street.
    - iv. Grand Avenue was seen as presenting more development sites within the Loop while Main presented more opportunities in other areas along the alignment.

# **Appendix A: Development Capacity Calculations**

DEVELOPMENT CAPACITY - MAIN ST. ALIGNMENT									
Area	Acres	Land SF	Projected FAR	Buildable SF	% Reusable	SF used	Housing at Stated %	DU's at Stated SF	Commercial
RIVER MARKET							90%	1200	
High Susceptibility: Essentially vacant: <\$20/sf Moderate Susceptibility: 20+ years: \$20-\$30	15 6	655,000 273,000		1,048,000 682,500		943,200 341,250	,	707 256	94,320 34,125
Subtotal	21	928,000		1,730,500		1,284,450	1,156,005	963	128,445
CENTRAL BUSINESS DISTRICT							40%	1000	
High Susceptibility: Essentially vacant: <\$50/sf	36	1,567,000	7.0	10,969,000	80%	8,775,200	3,510,080	3,510	5,265,120
Moderate Susceptibility: 20+ years: \$50-\$60 and Largely Vacant	3	116,000	8.0	928,000	60%	556,800	222,720	223	334,080
Subtotal	39	1,683,000		11,897,000		9,332,000	3,732,800	3,733	5,599,200
CROSSROADS ARTS DISTRICT							90%	1200	
High Susceptibility: Essentially vacant: <\$20/sf Moderate Susceptibility: 20+ years: \$20-\$30		1,142,000 1,703,000		1,827,200 4,257,500		1,644,480 2,980,250		1,233 2,235	164,448 298,025
Subtotal		2,845,000		6,084,700		4,624,730		3,469	462,473
SOUTH OF PERSHING							50%	1200	
High Susceptibility: Essentially vacant: <\$20/sf	6	275,000	3.0	825,000	90%	742,500	371,250	309	371,250
Moderate Susceptibility: 20+ years: \$20-\$30	0	0		0	60%	0	0	0	0
Subtotal	6	275,000		825,000		742,500	371,250	309	371,250
TOTAL FOR LINE	132	5,731,000		20,537,200		15,983,680	9,422,312	8,474	6,561,368
Essentially vacant	84	3,639,000	4.0	14,669,200	83%	12,105,380	6,210,242	5,760	5,895,138
Moderate susceptibility	48	2,092,000	2.8	5,868,000	66%	3,878,300	3,212,070	2,714	666,230

Current to somewhat improved market/pricing conditions and which parcels most likely to be available over first 20-30 years = "midterm"

Essentially Vacant = no improvements or improvements = less than 20% of land value

High Redevelopment Susceptibility = parcels where land and improvement value/land sf. is less than or equal to \$20/sf outside Downtown Core and less than \$50/sf in core.

Lower Redevelopment Susceptibility = parcels where land and improvement value/land sf. is less than or equal to \$30/sf but greater than \$20/sf outside Downtown core; and between \$50 and \$60/sf. in core.

Projected FAR = average expected ratio taking into account market conditions, structure type, zoning factors

% Reuseable = % of potential sites that are actually likely to be available during the projection period

Housing at stated % = percent of total buildout capacity assumed likely to be housing

DU's at Stated Sf = number of housing units that can be accomodated, given the average assumed housing unit size (gross sf)

Commercial = remaining capacity available for commercial and non residential uses

		1							
DEVELOPMENT CAPACITY - GRAND BLVD. ALIGNMENT  Area	Acres	Land SF	Projected FAR	Buildable SF	% Reusable	SF used	Housing at Stated %	DU's at Stated SF	Commercial
RIVER MARKET							90%	1200	
High Susceptibility: Essentially vacant: <\$20/sf	8	348,693	1.6	557,909	90%	502,118	451,906	377	50,212
Moderate Susceptibility: 20+ years: \$20-\$30	5	226,546	2.5	566,365	50%	283,183	254,864	212	28,318
Subtotal	13	575,239		1,124,274		785,300	706,770	589	78,530
CENTRAL BUSINESS DISTRICT							40%	1000	
High Susceptibility: Essentially vacant: <\$50/sf	34	1,481,800	7.0	10,372,600	80%	8,298,080	3,319,232	3,319	4,978,848
Moderate Susceptibility: 20+ years: \$50-\$60 and Largely Vacant	3	115,900	8.0	927,200	60%	556,320	222,528	223	333,792
Subtotal	37	1,597,700		11,299,800		8,854,400	3,541,760	3,542	5,312,640
CROSSROADS ARTS DISTRICT							90%	1200	
High Susceptibility: Essentially vacant: <\$20/sf	43	1,869,665	1.6	2,991,464	90%	2,692,318	2,423,086	2,019	269,232
Moderate Susceptibility: 20+ years: \$20-\$30	35	1,517,304	2.5	3,793,260	70%	2,655,282	2,389,754	1,991	265,528
Subtotal	78	3,386,969		6,784,724		5,347,600	4,812,840	4,011	534,760
SOUTH OF PERSHING							50%	1200	
High Susceptibility: Essentially vacant: <\$20/sf	6	275,574	3.0	826,722	90%	744,050	372,025	310	372,025
Moderate Susceptibility: 20+ years: \$20-\$30	0	0		0	60%	0	0	0	0
Subtotal	6	275,574		826,722		744,050	372,025	310	372,025
TOTAL FOR LINE	134	5,835,482		20,035,520		15,731,350	9,433,395	8,451	6,297,955
Essentially vacant	91	3,975,732	3.7	14,748,695	83%	12,236,565	6,566,249	6,025	5,670,316
Moderate susceptibility	43	1,859,750	2.8	5,286,825	66%	3,494,785	2,867,146	2,426	627,638
Current to somewhat improved market/pricing conditions and which parc	els most like	ely to be ava	ailable over f	irst 20-30 yea	ars = "midte	rm"			

Current to somewhat improved market/pricing conditions and which parcels most likely to be available over first 20-30 years = "midterm"

Essentially Vacant = no improvements or improvements = less than 20% of land value

High Redevelopment Susceptibility = parcels where land and improvement value/land sf. is less than or equal to \$20/sf outside Downtown Core and less than \$50/sf in core.

Lower Redevelopment Susceptibility = parcels where land and improvement value/land sf. is less than or equal to \$30/sf but greater than \$20/sf outside Downtown core; and between \$50 and \$60/sf. in core.

Projected FAR = average expected ratio taking into account market conditions, structure type, zoning factors

% Reuseable = % of potential sites that are actually likely to be available during the projection period

Housing at stated % = percent of total buildout capacity assumed likely to be housing

DU's at Stated Sf = number of housing units that can be accomodated, given the average assumed housing unit size (gross sf)

Commercial = remaining capacity available for commercial and non residential uses

## Appendix B: Details on Local Interviews with Business and Real Estate Community

### **Kansas City Streetcar Economic Development Interview Summary**

- 1. Describe the recent and emerging trends (decade since 2000 and forward) in downtown economic development (downtown = from River Market to and including Crown Center area)
  - Residential has gained market share. When the Mayor took office, there were about 7,000
    people living downtown. She set a goal of getting 10,000 people into the downtown area, and
    now there are 17,000. Part of this growth is due to the aggressive historic tax credits allowing for
    conversions of older office and warehouse buildings to residential units. There are new
    residential developments in the old federal courthouse building and the old Post Office building.
  - In the last 4 years, there has not been much growth in the office market due to the economy. In retail there was a major infusion 4 years ago, most of which is backed by the Cordish company in Baltimore, Maryland.
  - Entertainment has gained a great deal, with the Power & Light district and the Sprint Center —
    entertainment district may have added about 3,500 jobs. The rehabilitation of a few major
    entertainment venues and the upcoming opening of the Kaufman Center for the Performing Arts
    should bring people to the downtown area, particularly from the suburbs. The Crossroads area
    has seen a lot of rehabilitation of old, dilapidated buildings into arts venues. The First Friday for
    the Arts, on the First Friday of each month draws about 40 to 50 thousand people into
    downtown.
  - Institutional has gained in universities, but municipal is about the same as it has been
  - The Federal Reserve building is proposed to be an Embassy Suites, though this has not been finalized.
  - The downtown area had a large net gain in employment with the relocation of the IRS bringing 4 to 6 thousand jobs into the area (though this is just a relocation from another area). At the same time, some businesses have relocated out of downtown and moved to Kansas.
  - Downtown parking garages are friendly and available, but that does not make it easy for people coming in from out of town for conventions to get around.
  - The primary industries downtown are real estate, banking, law, and government.
  - Obstacles to development include the school district, development incentives, and public transportation. The perception of the KCMO school district, having all of the problems of innercity schools and being an underperforming school district, is a deterrent from residential development and bringing in families. There needs to be some standard incentives with regard to housing development downtown; the current incentive tools are cumbersome and often costly.
  - The largest constraint to development is economics, particularly in housing. In the office market, it is mostly competition because of the high vacancy rates – this makes it less likely to see new development and more likely for backfill
    - The housing market has unfulfilled demand due to the cost of land and the cost of parking. Rental rates are too low, though it appears that the newest developments are getting closer to where the market rental rates need to be.
    - Rental rates are currently at about \$1.05 per square foot, but need to be around \$1.40.
       The newest may be closer to \$1.20.

- 2. Within downtown, what are the preferred locations/corridors?
  - For **office**, there are a lot of different places, but the number one street would be Main, then Walnut, followed by Grand. DST and their companies are all on the west side
    - Inside the loop is probably the most desirable, but there hasn't been anything done because of the demand for new retail over office. The vacancy rates do not help with the desire to build new office space.
    - There are land owners who would like to develop office space, but this is unlikely to happen due to the high vacancy rates.
  - For **retail**, other than the P&L district, retail is scattered though there may be more of a concentration in the City Market area. Main and Walnut stop at the City Market but do not go through it.
    - Main Street is more commercialized on the retail side it slices right through the middle of the Power and Light District
    - The Power and Light district has been the big area of retail development and is the most ideal place. Further new development would likely be scattered around.
  - For residential, relatively speaking residential development is scattered, though there are
    existing concentrations in River Market, on the west side, in the Library District (10<sup>th</sup> &
    Baltimore), and the Freight House district.
    - o Within downtown there is really not a preferable location for residential development, it could happen anywhere.
    - O There is no real strategy for residential development, though there are many options available. There are places that would make sense the East Village, North Crossroads (presence of many surface lots), the "Commerce Bank" parking lots (6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup> streets, Main to Central), River Market, West Bluff there used to be housing there and DST tore it down to make office space.
  - Main Street is highly constrained and has a little more vibrancy and density of development, particularly commercial. Along Main from 8<sup>th</sup> to 13<sup>th</sup>/14<sup>th</sup> it is mainly office buildings. A streetcar is unlikely to alter the commercial or buying patterns here. Main is a good option because there is a lot of easily supported residential for mass transit.
  - **Grand Boulevard** is believed to have more right of way available, though not sure how this would impact development with a streetcar running down the middle of the road. Grand has the potential for more commercial development, if there were to be any. A potential issue with Grand is that it is one of the Boulevards in Kansas City, and there are a lot more design restrictions due to zoning on boulevards. These issues would have to be dealt with, but given the ROW along Grand, there may be more opportunity for development.
  - The convention center district ties into what will be the Kaufman Performing Arts Center and the downtown hotel corridor is also an area of interest for development to consider.
  - In general, the farther east you move, with regard to the proximity to the minority community and the identification of crime, there tend to be more issues.

- 3. Please describe what you see as the strategy and vision for economic development in the downtown area. How, if at all, does transit related development factor in?
  - There is a vision, but currently no strategy to implement it.
  - North Crossroads supports the area with all of the investment in the P&L district and other things
  - There are currently discussions going on regarding housing strategies for the city the
    Downtown Council has an agreement to convene a strategy session with some real estate
    developers in the city to see how they would go about developing housing downtown and where
    they would do it.
  - Any strategy decision will likely have to involve community participation, and if the development
    is on a larger scale, it will need to get civic, business, and charitable assistance. No deal will likely
    happen with just the city and a developer.
  - The Downtown Council would like to increase the population from 17,000 to 30,000 within the next ten or so years. They will have to try to enact changes and incentives for developers because the process of residential development and new builds needs to become easier.
  - Light rail should be a goal need to begin to provide people alternatives to having cars, particularly the younger people who want to live downtown and do not want to own cars. The current bus system is not ideal.
  - Focus on keeping the businesses that are already there and bringing in new ones while growing
    the existing ones as much as possible. There needs to be emphasis on trying to make the
    Crossroads area attractive for new startups in the IT area since Kansas City, Kansas and KCMO will
    be the first roll-out of Google's new high-speed network, so they need to support that decision
    with business activity.
- 4. To what extent do you see development happening over and above what is already planned if streetcar service is enacted? A lot? A little? What type residential or office? Does it depend on where the line goes or how long it is? Do you think that where a streetcar is located could significantly impact these locational trends and the level of development activity in the next 3 to 7 years?
  - The streetcar could have a large impact, primarily on residential development. The location of the streetcar will spur development, which is why it is so important to put it in the right place.
  - Does not see a lot of potential for office development, maybe more of a first floor walk up, but
    with the high vacancy rates there is little potential for new development; however, there is likely
    an opportunity to fill some of the spaces that are currently vacant. If it were one leg of a larger
    regional light rail system, there would be more potential to develop office space. At the current
    level, it is essentially a pedestrian mover and could be beneficial to people in town for
    conventions.
  - It is unfortunate that the system would be as short as it is, as extending the line to Country Club Plaza would be better because it brings in another residential base and allows for the movement of employees. There is not a lot of housing between Crown Center and the Downtown Loop, so there would be no residential base to pull ridership from.
  - None of the lines currently in play are movers of people from their homes to their places of employment.
  - Don't think that the streetcar would spur office development, but would likely spur commercial/retail and residential.

- The walk from the convention center area to the Power & Light district is about 10 to 15 minutes. While the streetcar does not serve the East to West market to get over there, there would be a lot of opportunity in the future.
- Getting maximum investment on the blocks immediately facing the line is the big priority.
- It seems as though Main would do relatively well regardless of the presence of the streetcar so it would have a higher positive differentiation being located on Grand than Main.
- Initially, growth would be slow but the streetcar is an announcement that this is where the mass transit will be, which should attract people in to begin filling in the office and residential spaces within 3 to 4 blocks of either side of the final alignment. Main would be better than Grand in this regard. Main also gets closer to the Convention Center, which brings in tourists to move around via the streetcar. There is more available space on Main, with many large institutions on Grand that will not move and more parcels and vacant space on Main that can be developed.
- 5. Do you think building a streetcar could take the place of other economic development subsidies such as tax credits or tax abatement, or do you think those would also still be needed to induce /increase residential development downtown? What about office development?
  - At the time being, there is going to be a need for the subsidies, so if all of the development subsidies go into developing the streetcar, there will be no further development. Hopefully in time, the need for subsidies will go away, but for now they are still necessary to spur development.
  - In terms of development of projects, there is not much in the way of new projects, most of the current developments are using historic tax credits and other forms of public gap financing to make things happen. Missouri is looking to cut back on tax programs for historic/brownfield restoration, which is a concern for this area.
  - The subsidy still needs to be there in the future. The rents are so low on commercial and office fronts that the only way to make them work is with public subsidy. One thing to look for is an uptick in the level of activity on the private development side and if there is an increase in the amount of equity that the private developers would be willing to put in, this is the only possible way to get rid of the subsidy. Development downtown is inherently more expensive than elsewhere. The streetcar may help, because it could cut down on higher level parking garages, which are much more costly than surface parking lots.
  - The hope is that there will be an increase in activity and equity. There are a few things happening that will hopefully increase interest in the downtown area the Kaufman Center for the Performing Arts, the city is still working on trying to get a convention hotel which could have a synergistic effect with the streetcar line.
  - Unlikely that will be able to have less in terms of incentives due to the large price differential on land inside and outside of the downtown area it is approximately \$40 per square foot to buy land downtown and about \$1.10 in the suburbs. In the suburbs, there is no real displacement cost as there is in downtown. There needs to be some sort of offsetting abatements or TIF in the downtown area. The streetcar could help with spending, but it would still not even be close to suburban locations.

- 6. Do you or the real estate/business community see any significant difference in likely market responses to building the streetcar line along Main Street vs. Grand Avenue? Which one is preferable and what are the factors determining your response?
  - Need to look at the viability of the businesses on Main but if there is a good, strong business on either street, it won't be affected much.
  - The goal is to get people moving in, and with a streetcar that will move folks along the 2 mile stretch, there are big considerations for which street accommodates mixed use the best.
  - When all of these are aggregated, Main seems to have more opportunity, and Grand doesn't serve the convention center, or the residential base as well as Main Street does. To hit the largest current residential neighborhoods, Grand would be too far away.
  - The availability of ready to go development sites is advantageous for either Grand or Main. They are equally accessible to all of the points of interest, so a focus should be on what could generate the most substantive development immediately on the block face.
  - Main and Grand are the best options, the primary goal should be to get as much pedestrian traffic and development potential along the routes, and these two are the best. The actual people-moving distance of the service is not that far.

#### Grand

- Grand does not make sense. Walnut would have made more sense, since some of the users are
  going to be convention goers, and from Bartle over to Grand is still a haul, probably more than
  necessary to entice the convention goers.
- Grand does not serve the residential community, though there is more today than there was previously on the south half.
- The interruption of having this in front of the Sprint Center (along Grand) would be a huge mistake if you expect to keep money in the downtown area. You want people to come out of the Sprint Center and go spend money, not hop on a trolley and go home.
- In the River Market area, Delaware Street is pretty developed, but along the Grand alignment there is nothing in the River Market. Most of the people are on Delaware and Wyandotte, and they would have to walk 4 or 5 blocks on the Grand alignment, and thus would likely not use it. The only opportunity in the River Market is on the west side.
- Grand has a bit of property, but it is also mostly fully developed up to Sprint Center. There may be opportunity for office there, but not as much for residential.
- On Grand, there may be some additional opportunity closer to Hospital Hill. There is some available land, though one of the universities may want to build student housing down there.
- Main may not serve the government areas well, which is one positive for Grand, but how many of
  the government employees would ride? Does it take them somewhere that they need to go?
   Tourists are always a big user of trolleys, so it is important to try to capture the tourist market.
- Of the two corridors, Grand has the greater potential to be a catalyst for new development based on spacing, lot availability, vacancies, etc. There is more availability on Grand than Main.
- Grand currently has more housing than Main, though Main goes right next to the Library District which has housing, but not directly on the alignment.
- If the goal is to ignite development possibilities that do not currently exist, there is more opportunity for that along Grand than Main.
- Grand would be less intrusive to auto traffic, though it is wide enough to be slightly intimidating to pedestrians trying to cross.

#### Main

- Main still has quite a few surface parking lots that could be used for future development.
- Main is landlocked, the biggest buildings are all built on Main, though some of the newer buildings are on Walnut.
- Inside the loop, Main St, with the exception of 7<sup>th</sup> and 8<sup>th</sup>, is fully developed. Tower Properties owns the land that is available but they are not inclined to do any development besides employee parking.
- Outside the loop going south, Main Street is basically vacant parking lots until the TWA building, so there is a lot of opportunity for development. On Grand, the KC Star owns the land, and likely would not be willing to give up property.
- Toward Crown Center, there is more opportunity on Main in the Freight House district where Lydia's and Jack Stack are, there is lots of space.
- Running the line straight through the middle of Crown Center may be bad as well. On Main, it is
  right next door, not far away and there is a skywalk connection to get from Crown Center to
  Union Station. This can be done at Grand as well, but it is a further walk, and people in the area
  do not like to walk far, so the less they need to walk, the more likely they are to use the service.
- 7. Can you please identify the biggest landowners/developers/businesses promoting specific large scale development projects in the "downtown" and where their holdings are located? Have any specifically indicated support for a streetcar and a specific preference for its route? (Main or Grand)
  - Tower Properties is a big owner
  - On Grand, it would be a mistake to have really great transit right in front of the Sprint Center because it will not allow for the capturing of people in town for events to spend additional money at restaurants and bars.
  - Some people have concerns about Main, that it will be developed and no one will be able to access their parking lots, but that is part of progress.
  - Copaken Brooks is a major developer in Downtown. They have cleared a block on Grand and 12<sup>th</sup> or 13<sup>th</sup> that is ready for development, but they need a tenant.
  - There is a small, currently undeveloped piece of land that is currently a parking lot for one office building and Union Station, east of the BCBS building, on the Union Station Property, almost directly between Main and Grand, which could be built out for air rights.
  - Have not heard anything about who is for or against it, though Cordish (the controller of the P&L district) does not like either alternative because it will destroy the market while being build.
- 8. Do you think new residential development (as opposed to old building renovations/conversions) is economically viable anywhere downtown without subsidies? Where? What type of construction and would it be for sale or rental? What about other types of development, e.g. office?
  - Not at this point, more development is necessary to possibly remove subsidies in the future if enough development happens and raises market prices sufficiently.
  - There is an abundance of lofts, and very few more options in the downtown area for conversions. Also, a few of the buildings that do have opportunity for conversion have parking issues.
  - Streetcar will not solve the bigger issue of mobility in Kansas City, but it is a starting point
  - No, it is not economically viable without credits. Development in the downtown area is inherently more expensive. The historic renovation tax credits have made the renovation of some



- buildings economically viable. However, for buildings coming out of the ground, it is really too expensive. Streetcar may make this easier, but it would not offset the costs.
- A streetcar could help change the perception of downtown, help to prioritize economic
  development, help with the convention business, and may help get a hotel for the convention
  business as it would give developers the sense that the city is committed to residential
  development. However, it would still not offset the other costs.



# Technical Memorandum Environmental Review

# **Executive Summary**

This documents a review of key environmental factors associated with five alternatives combinations of alignment and transit technology in the downtown area of Kansas City, Missouri. While this review follows the checklist for a documented Categorical Exclusion (DCE) environmental action, this review is not intended to be a DCE.

In summary, no significant environmental issues are shown for any of the alternatives.

# **Project Description**

The purpose of this section is to provide an early, reconnaissance level identification of issues related to environmental compliance for candidate alignments being considered apart of the Downtown Kansas City Corridor Alternatives Analysis. Preparation of future NEPA analyses and documentation will be necessary if a project is moved forward with the intent to pursue federal funding for the project, or if there is another federal nexus for the project. This overview presents a broad view of the environmental compliance requirements that would likely be required. While this review follows the checklist for a documented Categorical Exclusion (DCE) environmental action, this review is not intended to be a DCE.

This AA is intended to identify an alignment and modal technology from among these five alternatives:

- 1. No Build
- 2. Grand Avenue with streetcar
- 3. Main Street with streetcar
- 4. Main Street with bus
- 5. Grand Avenue with bus







# Regional Alternatives Analysis:

Figure 1 and Figure 2 show, respectively, the streetcar and bus alternatives on Grand Avenue and Main Street. As part of the streetcar alternatives, a new vehicle maintenance facility will be part of the project. Since a location for such a facility has not been determined the environmental review of that facility has not been factored into this analysis. As many of the potential locations are in low-impact areas it is not anticipated that a given site will materially impact the environmental aspects of this review.

<sup>&</sup>lt;sup>2</sup> See Maintenance Facility Siting Report – Final, HDR Engineering, Inc., July 2011







 $<sup>^{1}</sup>$  The two bus alternatives would use the existing KCATA facility located near East  $18^{\rm th}$  and Forest Avenues in Kansas City, Missouri.

Figure 1: Alternative Downtown Kansas City Streetcar Alignments



TIER 2 ENHANCED BUS ALTERNATIVES

Figure 2: Alternative Downtown Kansas City Bus Alignments



# **Assessment of Environmental Resource Impact**

This provides a cursory review of key regulatory areas that are typically considered in a Documented Categorical Exclusion (DCE).

Table 4 at the end of the section compares and summarizes the issues associated with this environmental review.

# **Location and Zoning**

The work of the Tier 1 Screening associated with this study, indicates that alternatives shown earlier are compliant with local zoning and planning.

# **Traffic and Parking**

Main Street and Grand Boulevard are the main north-south arterial streets within the study corridor. They are spine roads serving the heart of the Kansas City central business district. They also intersect with numerous important east-west streets over the two-mile study corridor.

As can be seen in Figure 3, Grand Boulevard ties into Riverfront Drive on the north end and runs south the entire length of the study corridor. North of the Downtown Loop, it is generally a two-lane street with parking on both sides. Within the Loop, it widens to a six-lane street; however, the outside lanes are often used for parking in this section. The recently reconstructed portions of Grand Boulevard near the Sprint Center carry four lanes, with left turn-lanes. South of the Loop, Grand Boulevard is again a six-lane street, with parking often occupying the outside lanes, until it reaches Crown Center/Pershing Boulevard. From Crown Center south, it is a four-lane roadway with left turn-lanes and no parking on either side. The speed limit on Grand Boulevard is 35 mph. Daily traffic volumes on Grand Boulevard range from approximately 8,000 vehicles at the north end of the Downtown Loop, to 14,000 vehicles near the Sprint Center. South of the Loop, the volumes are near 12,000 vehicles.

Within the Downtown Loop, Main Street varies in width from four to six lanes, with parking on both sides in many, but not all areas. There are few intersections with turn lanes. A southbound bus lane is marked from near 10<sup>th</sup> Street to the southern edge of the Loop. However, this lane is typically used by both buses and the general public even during the hours it is officially in operation. At the north edge of the Loop, Main Street passes over I-70 to connect with Delaware Street. Delaware Street continues north to 3<sup>rd</sup> Street. South of the loop, Main Street carries between two and three southbound lanes and between one and three northbound lanes, depending on the location. Again, part of the corridor has a marked southbound bus-lane and there is parking on one or both sides for part of this section. The speed limit on Main Street is 35 mph. Daily traffic volumes on Main Street within the Loop range from just over 4,000 vehicles near I-70 to over 8,000 vehicles at the south edge of the Loop. South of the Loop, the volumes increase to over 10,000 vehicles per day.







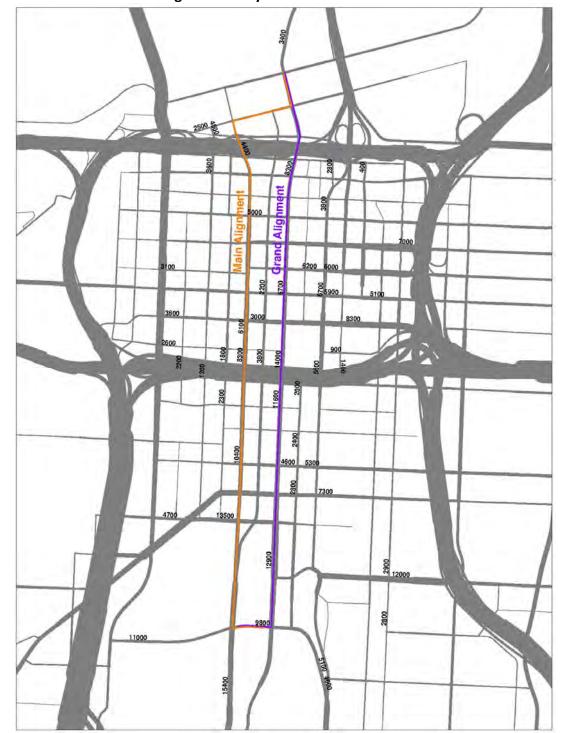


Figure 3: Study Area Traffic Volumes

There are several major east-west cross-street pairs serving the Loop. One pair is  $10^{th}$  Street (one-way eastbound) and  $11^{th}$  Street (one-way westbound). This pair carries traffic to and from a series of I-70 / US-71 freeway ramps at the east edge of the Loop, as well as local destinations east of the Loop. A second pair is  $12^{th}$  Street (one-way eastbound) and  $13^{th}$  Street (one-way westbound). Of these two







# Regional Alternatives Analysis:

streets, 13<sup>th</sup> Street carries the larger volume of traffic because it has a direct ramp connection from I-70 westbound (on the east side of the Loop). 12<sup>th</sup> Street provides the only full-access interchange on the west side of the Loop. The one-way Truman Road sections that parallel I-670 at the south edge of the Loop provide another key pair of directional routes, with ramps to and from I-670.

South of the Loop, 19<sup>th</sup> Street (extending from Southwest Boulevard) and 20<sup>th</sup> Street provide an important connection to/from the west. 22<sup>nd</sup> Street provides a key link to the east (US-71 and beyond) and Pershing Road connects locations at the southern end of the corridor.

In the future, weekday traffic volumes on Main Street and Grand Boulevard are expected to increase due to continued downtown development and re-development. However, by opening day in 2015 it is not expected that traffic will increase by more than three to five percent. Thus, the current volumes with some modest background growth can be used for an initial planning level traffic operations analysis.

As part of this analysis, it is important to consider peak-hour capacity issues and how they would relate to new BRT or streetcar service on either Main Street or Grand Boulevard. This evaluation must also take into consideration parking plans for the corridor. Specifically, there are discussions regarding the elimination of peak hour parking restrictions on one or both streets. The current parking on Main Street and Grand Boulevard (by restriction type) is shown in Figure 4. This parking change could reduce the number of travel lanes (or at least through travel lanes) in one or both directions.

## **Streetcar Operations**

The streetcar vehicles would travel in a standard drive lane on either Main Street or Grand Boulevard. The streetcar would affect roadway capacity in a manner similar to a bus traveling in the drive lane, including lane blockages during passenger boarding and alighting. It would therefore not be expected to substantially reduce the roadway speeds or capacity when compared with bus operations.

What could affect roadway capacity is the manner in which parking is treated. Parking adjustments of some type would likely be required with the streetcar alternatives. Either parking would need to be eliminated, so that the streetcar can run in the outside curb lane, or the parking would need to be made permanent so that the streetcar is in the outside travel lane, with curb extensions (bump-outs) at stop locations. (A third option, locating the streetcar tracks within a flush median and providing station platforms in the median, would – from a parking perspective – operate as a hybrid of the two, allowing parking to remain flexible in one direction.) Given the existing roadway capacity, in the two corridors, either option is feasible in the near-term. At a planning level, the near-term traffic volumes do not require more than two through lanes in either direction. Thus the third lane (where present) could be converted to full-time parking spaces without time of day restrictions. Where only two lanes are present, they would both be required. In addition, parking restrictions may be required to allow for turn-lanes at critical intersections. In the longer term there may be segments, especially within the Loop, where it is important to maintain a third continuous lane even if it is only for turning traffic. This would need to be investigated further in the detailed planning and design phases.









**Figure 4: Alignment Parking Locations** 

Overall, based on the current traffic volumes in both corridors, it appears that there is sufficient capacity to support the addition of the streetcar in either corridor. If parking adjustments are made such that only two lanes are available in both directions on the street to be served by the streetcar, then placing the streetcar on Main Street would be preferred as it has lower current and projected future volumes.







However, if parking is to be removed from Grand Boulevard, then that street could better accommodate the streetcar from a roadway capacity standpoint. Conversely, that removal of parking would potentially affect a number of businesses and downtown residents/visitors.

## **BRT Operations**

The BRT option would not require changes to all parking spaces along a block, but it would require adjustments that facilitate fast, high-frequency operations and clear stop locations. It is not expected that the BRT option would negatively affect either corridor in a substantial manner.

### **Aesthetics**

Typical visual/aesthetic issues would include:

- A. Anticipated visual effects of project facilities (e.g., overhead catenary system, station platforms, location and visual effects of maintenance facilities, etc.) would be evaluated for the general corridor. Anticipated visual effects on historic structures and public spaces (e.g., fountains, monuments/sculptures, plazas, etc.) also would be evaluated. Project design efforts would address significant visual issues raised in the evaluation.
- B. Design of project features would typically be done to fit within the existing streetscape and urban environment. The project design would need to be sensitive to the character of the streetscape and the general urban environment in the project area. The project design may need to include enhancements or design features that would improve the visual appearance of the project area.
- C. The visual analysis would consider effects to key structures, resources, and vistas in the vicinity of the selected corridor.

# **Air Quality**

Typically air quality issues for a transit project such as the candidate Downtown Corridor alignments would include:

A. Air quality conformity - The streetcar mode of the Downtown Corridor Alternatives Analysis Project, sponsored by KCATA (a SMART MOVES Urban Corridor), is included in *Transportation Outlook 2040*, MARCs Long-Range Transportation Plan (LRTP). An Air Quality Analysis was conducted by MARC for the projects listed in the LRTP. The LRTP AQ analysis indicated that regional mobile source emissions of volatile organic compounds (VOCs) and nitrogen oxides (NO<sub>x</sub>) remain below the levels budgeted in the regional State Implementation Plan (SIP), while accounting for the roadway capacity projects listed in the 2010-2014 Transportation Improvement Program (TIP) and the LRTP as being operational by 2040. While the streetcar mode is included in the current LRTP, it is not certain if the bus alternatives are also included.

The metropolitan and statewide planning regulations that govern MARCs LRTP and TIP require projects within both documents to be financially constrained for the time periods each plan covers. Regionally significant roadway projects and fixed-guideway transit projects must provide sufficient detail to permit an air quality analysis. Projects both in the LRTP and TIP have been analyzed as a group to determine that their project air quality impacts are









B. Hot spot analyses may be necessary if there are significant traffic impacts at intersections.

Relative to greenhouse gases and climate change, the federal and state regulatory requirements continue to emerge. Generally, relatively small projects such as a streetcar or enhanced bus service do not have a significant effect on GHG at a global level, *but* they can contribute to lower VMT which can contribute to small improvements in local and regional air quality.

## **Coastal Zone**

Study area is not in or near a designated coastal zone management area.

### **Environmental Justice**

Socio-economic data for the study corridor and nearby vicinity was examined to identify potential low-income and minority communities that could be affected by the proposed transportation improvement project. While this effect could well be positive, it is still necessary to identify these communities and determine how the project might affect them. This is in accordance with Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.

The environmental analysis prepared for the 2009 LRT evaluation also considered this issue. That study employed Census 2000 data to identify Census Block Groups that met specific low-income and minority population thresholds.

lower than a budgeted amount to ensure that the region's air quality is not adversely affected by mobile-source pollution. (SOURCE: Transportation Outlook 2040; Appendix G: Air Quality Analysis)







# Regional Alternatives Analysis:

Figure 5 shows how Census Block Groups in the study area were categorized with respect to meeting these thresholds and defining environmental justice (EJ) communities. As shown, by overlaying the currently proposed BRT/streetcar alignments it is clear that the potential new service will be in proximity to EJ populations. Given the nature of the project, with expected transit service and air quality benefits and little if any new right-of-way requirements, it is expected that the effect on these communities will be positive. However, a comparison of the two alignments does not show that one will be substantially better than the other in serving these communities.

Even a more detailed examination of Census 2010 minority populations at the block level (see Figure 6), does not show a clear distinction between the alignments. Income data is only available at the larger Block Group geography, and only for the 2000 Census, so a more detailed evaluation by income is not possible. As shown earlier in





Figure 5, this scale of data does not show a clear differentiation between the two routes.

Disability data was also considered; however, neither route served this demographic group better than the other. With regard to the disabled population, the streetcar alternatives are however preferable to BRT. Streetcars provide low-floor and level platform loading that would be superior to the bus boarding and alighting options.

## **Hazardous Materials**

The 2009 Light Rail Transit (LRT) Alternatives Analysis documentation was reviewed to assess the potential for issues related to contaminated soil and/or groundwater. The 2009 study included a complete database search of state and Federal environmental records (over 20 databases and lists) as well as a review of Sanborn Fire Insurance Maps. This search identified 575 sites with the "potential to impact the right-of-way under consideration" in the over twenty mile LRT corridor, including the study for this alternatives analysis. These sites were subsequently divided into four risk categories: "No", "Low", "Medium", or "High" based on their expected potential for soil and/or groundwater impacts. Only the sites identified as "Medium" or "High" were presented in the documentation available for review. Sites identified as No or Low were not expected to present issues for project construction and operation.

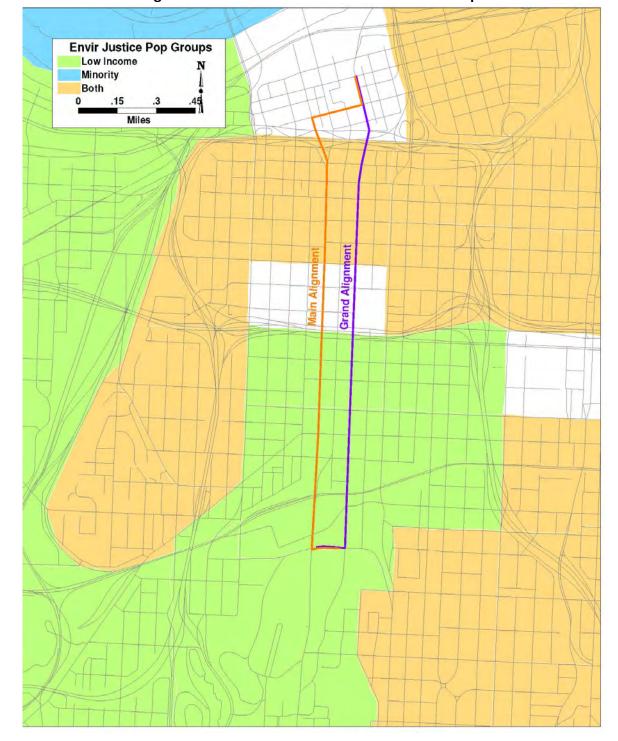
The current study corridor is quite similar to the proposed 2009 LRT corridors in the downtown area. Both considered Main Street and Grand Avenue as possible routes. Therefore it is expected that the six High and Medium priority sites identified for the downtown area for the 2009 study would apply to directly to the current evaluation. Of the identified sites, three are along or in the vicinity of Grand, while one is on Main Street. One site is on Walnut Street and the final site is just north of the project terminus. The six sites are listed in the Table 1 on page 15.

<sup>&</sup>lt;sup>4</sup> Kansas City Area Transportation Authority, *Light Rail Alternatives Analysis*, 2009.









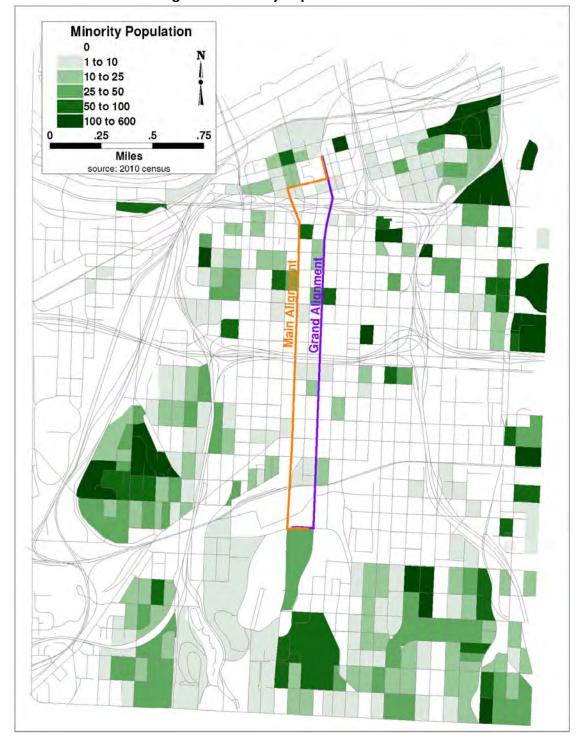
**Figure 5: Locations of Environmental Justice Groups** 

**Source**: Compiled from 2010 US Census









**Figure 6: Minority Population Densities** 

Source: 2010 US Census







For the bus rapid transit alternatives, very little construction will be required (e.g. shelters and signs). Therefore, it should be possible to avoid the sites listed above and/or implement the project without hazardous waste site impacts.

For the streetcar alternatives, the construction will include shallow excavation to install the rails as well as stations, signage, and the required power lines. Most if not all of this construction is expected to occur within the existing public right-of-way. Therefore, it should still be possible to avoid the sites listed above and/or implement the project without hazardous waste site impacts.

Based on the available information, it does not appear that there are any major hazardous materials related obstacles to implementing bus rapid transit or streetcar service on either Main Street or Grand. The small number of sites, with the distribution noted, also does not indicate that one street alignment should be substantially preferred over the over with respect to hazardous materials.

# **Navigable Waterways**

While the Missouri River is less than 1,500 feet from potential northern termini of the project alternatives, none are considered close enough to impact the waterway.

**Table 1: Locations with Potential Hazardous Materials** 

	Table 1. Location	S WILLI PUL	ential mazaruous iviateriais
Location	Name	Priority	Description (quoted from 2009 LRT Study)
899 and 901 East 1st Street (north of the proposed northern terminus)	Kansas City Coal Gas	Medium	"The site is listed as an active CERCLIS and voluntary cleanup program (VCP) site and is currently owned by Missouri Gas Energy. The site was formerly the manufactured coal gas plant and known impacts at the site include benzene, toluene, ethylbenzene, xylene (BTEX), coal tar, and semi-volatile organic compounds (SVOCs). According to the EDR database report, remedial actions have taken place at the site. No other information was available regarding the site."
1801 Walnut Street	Grand at 18th DEVCO	Medium	"The site is listed as a VCP and Engineering/Institutional Controls (EC/IC) site. Known impacts at the site include benzene, total petroleum hydrocarbons (TPH), SVOCs, and volatile organic compounds. According to the EDR database report, monitoring and restrictive covenant are enacted for the site. No other information was available regarding the site."
3920 Main Street	NA - Spill Site	High	"The site is listed as a Spill site. According to the EDR database report, a tenant at the site reported a petroleum fluid seeping through cracks in the building foundation. The fire department believed the fluid be have been fuel oil from a unknown UST. A test of the fluid indicated that the material maybe solvents from a former on-site dry cleaner. No other actions were reported for the site."
Walnut St. and 18th St. (Sanborn Map Year 1963)	Filling station with gasoline tanks	High	" it is likely a majority of the noted USTs have been removed. However, due to the age of the sites, UST design standards pre-dating
Grand Ave. and 18th St. (Sanborn Map Year 1963)	Filling station with gasoline tanks	High	the late 1980s, and the lack of significant environmental regulation prior to the late 1960s, it is likely that many of the USTs had releases and the impacted soils and groundwater were not remediated following removal
100 feet south of Grand Ave. and 20th St. (Sanborn Map Year 1963)	Filling station with gasoline tanks	High	of the USTs. Petroleum products that may have been released at these historical sites has likely attenuated to a degree, but without further investigation, the level attenuation and impact is not known."

**SOURCE:** Complied by HDR Engineering, Inc. from 2009 Light Rail Transit Alternatives Analysis, Kansas City Area Transportation Authority (KCATA)







### **Noise and Vibration**

Noise and vibration effects from buses on either Main Street or Grand Avenue would be similar to what exists today with the operations of the MAX and other buses in the study area. Noise and vibration effects from Streetcars would be relatively similar to the effects of existing buses and trucks in the area. Generally noise from operations of a Streetcar are not significant in an active urban environment such as downtown Kansas City, but could be more significant in natural or quiet environments. Also, it has generally been found that vibration is not a significant issue related to a operations of a streetcar project unless there is a particularly sensitive building or function along the alignment and in close proximity to the trackway. Potentially sensitive receptors along the routes have not yet been specifically identified, but could include residences, and performance venues located very close to the tracks. Construction of project improvements would likely include both noise and vibration that would be short term and temporary in nature.

If a streetcar alternative is selected, a detailed evaluation of the noise and vibration effects would be conducted in accordance with FTA noise and vibration analysis requirements. The evaluation would have several steps:

- 1. Assess the existing noise levels along the study alignment(s). The existing noise levels are typically high in corridors that are along urban arterials with high traffic volumes including trucks and buses, and lower in areas with lower traffic volumes and fewer trucks and buses.
- Identify noise sensitive uses (or receptors) along the proposed alignments such as schools, hospitals, residences, parks, libraries, etc. Vibration sensitive uses could include research facilities with vibration sensitive equipment or recording studios.
- 3. Develop a noise model that takes into account the local context and project the noise levels associated with the proposed transit improvements. The current and projected speed of the traffic, trucks, buses, and future transit improvements (i.e. buses or streetcars) would be a key factor in assessing noise and vibration effects of a proposed Streetcar project, and would be a key factor in determining if there were going to be increased noise levels expected to be generated by the Streetcar operations.
- 4. If significant noise or vibration impacts were to be identified, then mitigation measures would be identified, evaluated and if necessary implemented.

# **Prime and Unique Farmlands**

None of the alternatives, which are all located in or near downtown Kansas City, Missouri, involve the use of any prime or unique farmlands.

#### Resources

This section reviews issues on the biological and natural environment, cultural and historic resources as well as parklands.

## **Biological and Natural**

Due to the built-up urban environment of the study area, minimal to no impacts to natural and biological resources are anticipated. For the purposes of NEPA, the typical biological and ecosystem issues would be addressed for both downtown alternative corridors including assessments in the topic areas listed below.







- A. **Threatened and Endangered Species (T&E)** No federally-listed species or their habitats have been identified within the study area. Peregrine falcons (state-listed endangered) were released downtown in the late 1990s. An active peregrine nest, located on the Commerce Tower Building (9<sup>th</sup> Street and Main Street) is monitored by the MDC and KCPL. No other federal or state-listed T&E species have been documented within the Study Area.
- B. Wetlands, Waters of the U.S., and Other Aquatic Resources Due to the urbanized nature of the study area, no wetlands, natural water features, or floodplains were found to exist within or adjacent to the corridor alignments. Several man-made fountains are located throughout the Study Area. Wetlands and natural water features do occur within the Missouri River corridor located north of the Study Area. Project related effects would be minimal but must be evaluated and documented.
- C. Vegetation and Wildlife Although the project area is urbanized, the downtown area supports a number of migratory birds and urban wildlife species. In addition to the peregrine falcon, the American kestrel is known to nest on a number of the art-deco buildings, while a number of owl and hawk species nest along the Missouri River and along the rail corridor that connects to Union Station. The urban landscape includes native and non-native vegetation located in landscaped roadway medians and planting beds. These landscaped areas provide limited nesting habitat and could be altered or removed during construction. Project related effects would be minimal but must be evaluated and documented.

#### **Cultural and Historic**

The analysis of historic, archaeological, and cultural resources is important due to the presence of a number of NRHP-listed and NRHP-eligible structures within the study area. Any structure or other potential historic resource over 50 years of age could be eligible for protection under city, state, and federal historic preservation regulations. Because historically, Streetcars were instrumental in the development of downtown Kansas City, reintroduction of modern streetcars would not generally be incompatible with the area.

A. The first step in an analysis of historic resources would be to identify an area of potential effect (APE) for the selected alignment, followed by conducting an inventory of all previously identified historic and archaeological resources in the vicinity of the corridor along with those resources that would be eligible for listing. According to an initial inventory completed along the two candidate corridors, approximately 38 structures/places are already listed on the NRHP (19 along Main Street, 19 along Grand Avenue). Another 40 structures/places may be considered eligible for listing on the NRHP (13 along Main Street, 27 along Grand Avenue). See Figure 7 and Table 2.



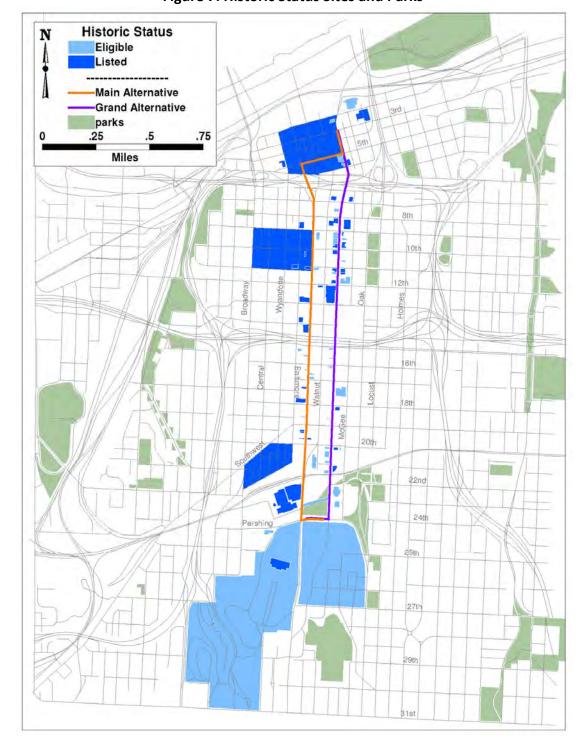


Figure 7: Historic Status Sites and Parks



# **Table 2: List of Historical Sites**

Street & Bloc	Number	Building Name	Eligibli
GRAND BLVD			
1-2nd	115	Kansas City Power and Light Power Plant	Е
	202	Asian Market (Old Safeway warehouse)	E
	500 E. Third	Cold Storage Bldg. E.3rd Street	Listed
400		Old Town Historic District	Listed
		Historic City Market Area	
		Boundary Increase I, II, III.	
500	506	Public Garage	E
	523	Helping Hand Institute	Listed
	100-24 E. Missouri	The DeFeo Building	Е
		I-70 Loop	
700	100 E. 7th	Western Union Building	Listed
	100 E. Admiral	Buick Building Lofts	Listed
	718	Grand Auto Park Building	Е
	719	White Castle	Е
800	811	US Courthouse and Post Office	Listed
	818	Scarritt Building	Listed
900	900	Rialto Building	Е
	903	Grand Avenue Temple and Office Building	Listed
	910	Beckham Building	Е
	913	Benton Building	E
	916	City National Garage	Е
	923	Federal Reserve Bank of Kansas City	Listed
	928	RA Long Building	Listed
10.55			E
1000	4000		
	1006	The Gates Building	Listed
	1007	Gardiner Lathrop Building	Е
4400	4404	Professional Poilding	1:-11
1100	1101	Professional Building	Listed
	1102	Bryant Building	Listed E
	1110	The Rock Building	
	1111	Gate City National Bank	Listed E
	1125	Traders National Bank Building Palace Clothing Co. Bldg. (1126-1128)	
	1126	raiace Clothing Co. bidg. (1126-1128)	Listed
1200	1200	Panfila Building	Liotod
1200	1200	Bonfils Building	Listed

Table continued







# Regional Alternatives Analysis: Downtown Corridor

### Table continued

		Midtown Area	
1500	1500	The Tempo Company Building	Е
	1524	Automobile Merchandising Corporation Building	Е
1600	1600	The Mitchell Motor Company Building	Е
1700	1709-1729	The Kansas City Star Building	Е
1800	1801-1805	City Bank Building	Listed
	1824	William Pitman Confectioner Building	Е
2000	2000	The Fisk Rubber Company Building	Е
	2001	Firestone Building	Listed
	2008	Isle Orthotic Building	Е
	2030	Anderson Photography Building	Е
2100	2101	Coca Cola	Listed
	2110	Overland Automobile Company Building	Е
2200			
2300	2341	1970s future eleigibilty	Е
	2345	Mutual Benefit Life Insurance Building	Е
		Subway access to Union Station	Е
2400		Crown Center Development	Е
MAIN STREET			
200-400		Old Town Historic District	Listed
200 .00		Boundary Increases I, II, and III	
		Doundary moroacco, ii, and iii	
500	200 W. 5th Street	Richards and Conover Hardware Co, Bldg.	Listed
	200 111 0111 011001		
600-700		I-70 Loop	
000 1 00		. 10 2006	
800	8th and Main	Muse of the Missouri statue	Е
	our arra man	The state of the s	_
900	District	9th and Baltimore Historic District	Listed
	20 W. 9th Street	New York Life Building	Listed
	911	Commerce Tower	E
	2		
1000	15 W. 10th Street	Land Bank Building	Listed
. 300	1044	George B. Peck Dry Goods Co. Bldg.	Listed
	.311		
1100	11th and Petticoat	Harzfeld Building	Е
1.00	106 W. 11th Street	Continental Hotel	_
	106 W. 11th Street	Continental Hotel	ļ

Table continued



### Table continued

1200	1232	Loew's Midland Theatre	Listed
	25 E. 12th Street	Chambers Building	Listed
1300	1327-1325 Baltimore	President Hotel	Listed
1400	1400	Mainstreet Theatre	Listed
		Midtown Area	
1500	1501 Baltimore	Lowe & Campbell Building	Е
	1520	Lane Blue Print Co. Building	Е
1600	1610	Bldg. W/Cast Iron Front	Е
	1617	NARA	Е
	1627	MainMark Building	Е
1700	1712	Globe Storage and Transfer Co. Bldg.	Listed
	1740	TWA World Headquarters Bldg.	Listed
		·	
1800	1822	?	Е
1900	1904-1906	Monroe Hotel	Listed
	1908	Thomas J.Pendergast HQ Building	Listed
	1922	Rieger Hotel	Listed
	1925	Midwest Hotel	Listed
2000			
2100s	2100 Walnut	Belger complex (3 buildings)	Е
	E. 21st Street	Lemp Brewery Building	Е
		Crossroads Freighthouse District	Listed
Pershing Ave.		Union Station (Main and Pershing)	Listed
		Pershing Building	Е
W. 26th Street	100	Liberty Memorial	Listed
		Penn Valley Park	E ,



- A. Because of the density of development within the study area, archaeological resources may be less prevalent, though not less important. Remnants of past development previous streetcar system, infrastructure, early settlements may be encountered during construction. The potential to encounter such resources along with their probable location would be identified and documented.
- B. The next step would be to evaluate the possible effects of the proposed project on the identified resources and/or districts. Effects to each eligible or listed property would be defined as "no effect, no adverse effect, or adverse effect". Significant focus would be on any resources where there could be "adverse effects".
- C. Consultation between the project sponsors, FTA, and the Missouri State Historic Preservation Officer (SHPO) would be necessary. Tribal consultation, with FTA as the lead agency, would also be required.
- D. If the project would have an "adverse effect" on any resource(s), then more extensive consultation would be required between FTA and the SHPO.
- E. A technical memorandum and memorandum of understanding (MOU) would be prepared to document the historic analysis, consultation, findings, and mitigation commitments if any. This information also would be included in a Section 4(f) Evaluation developed for the project (described below).

### **Parklands**

A typical parklands analysis during project development for both downtown alternative corridors would identify parks and recreation areas in the vicinity of the proposed project and assess any potential effects of the project improvements.

- A. Kansas City Parks and Recreation Department (KCPRD) has jurisdiction over parks, recreation areas, boulevards, parkways, statues, fountains, and memorials. A number of parks, memorials, and fountains are located within and/or adjacent to the downtown alternative corridors (see, again, Figure 7 as well as Figure 8). Direct and indirect impacts to these resources would need to be addressed along with mitigation, as appropriate, for unavoidable impacts under Section 4(f) (see below). Early coordination with KCPRD is encouraged. (See Table 3)
- B. Federal regulation known as "Section 4(f)" is from the *U.S. Department of Transportation* (*USDOT*) *Act of 1966* address the use of "public park and recreation lands, wildlife and waterfowl refuges and historic sites" by transportation projects. In 1983 and 2005 the Act was amended and codified in 49 USC Section 303. It states in part that it is the policy of the United States Government that special effort is made to preserve the natural beauty of the countryside and public park and recreation lands...and historic sites. This regulation requires that the USDOT (and any project supported by USDOT funds) avoid "use" of Section 4(f) properties unless there is no feasible and prudent alternative to using the land or unless the impact will be *de minimis*. A *de minimis* impact is defined as an impact that would not adversely affect the features, attributes, or activities qualifying the property for protection under Section 4(f).
- C. Federal regulation known as "Section 6(f)" is from the Land and Water Conservation Fund (LWCF) Act of 1965 as amended (Public Law 88-578; 16 U.S.C. 4601-4 et seq.). The LWCF established a funding source for both Federal acquisition of park and recreation lands and a matching grant program for state and local governments to fund recreation planning,







acquisition, and development. It states that *no property acquired or developed with LWCF* assistance shall be converted to other than public outdoor recreation uses without the approval of the Secretary of the Department of the Interior, and only if he/she finds it to be in accord with the then existing SCORP and only upon such conditions as he/she deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location. This regulation requires that any Federal action (regardless of the federal agency involved) avoid the conversion of Section 6(f) properties for non-outdoor recreational uses unless other comparable properties (in terms of size, location, function, and value) can be provided as replacement for the affected property. The property occupied by Oppenstein Brothers Memorial Park, located at E. 12th Street and Walnut Street, was acquired with LWCF money in 1979.

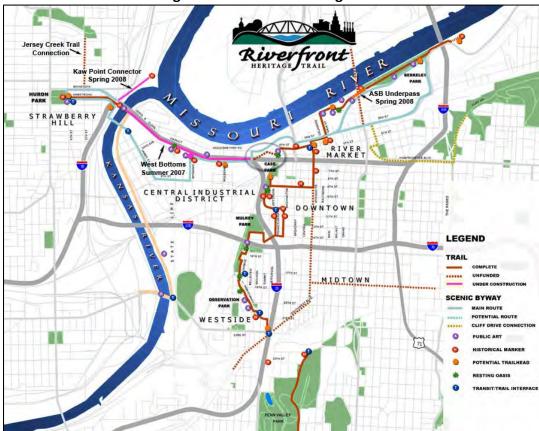
Table 3: Properties under the Jurisdiction of KCPRD

NO NO YES	NO NO
NO	NO
NO	NO
YES	
	YES
NO	NO
YES	NO
YES	NO
ES (crosses)	YES (crosses)
ES (crosses)	YES (crosses)
NO	YES
NO	YES
YES	YES
	YES YES YES ES (crosses) NO NO YES









**Figure 8: Riverfront Heritage Trail** 

### Seismic

There are no known seismic conditions associated with the alternatives. However, all projects would be designed to applicable seismic standards.

# **Water Quality and Hydrology**

Issues related to water quality and hydrology for projects such as the downtown alternative corridors would include project related stormwater runoff and water quality issues related to stormwater management.

- A. No floodplains or waters of the U.S. are crossed by either alignment.
- B. The City of Kansas City, Missouri has a combined sewer system. The City is currently implementing an Overflow Control Plan that was developed to meet regulatory requirements put forth by the Environmental Protection Agency (EPA) and the Missouri Department of Natural Resources (MDNR) related to minimizing overflows from the combined sewer and separate sewer systems. Under the 2010 Consent Decree, Combined Sewer Overflow (CSO) control measures were identified for implementation by drainage basin. Consideration of the potential effects of the selected alternative on downstream receiving waters would be required. Because the Study Area is located within the Turkey Creek/Central Industrial District Basin







identified in the Consent Decree, green infrastructure solutions as well as construction best management practices (BMPs) would need to be identified for the selected alternative and required for implementation as part of the project design.

# **Construction Impacts**

The effects of construction would vary, depending on the selected project. If either of the bus alternatives is selected, there would be limited new construction in the study area for project improvements. If either of the Streetcar Alternatives is selected, there would be short-term construction in the study area including the trackway, stops, power substations, overhead centenary, a maintenance facility and related improvements. Construction would generally be within the street right-of-way, and would take approximately 2 years from the beginning of construction to operations. Construction methods could be employed that would limit construction in any one location to a much shorter period. Primary effects of construction would be to traffic, parking, and access in the vicinity of the project improvements. Access to adjacent uses could be maintained to all uses during construction.

Construction of the project would generate local jobs during the construction period and could provide economic benefits to businesses that support the construction efforts. Conversely temporary construction activities can disrupt business operations in the vicinity of the construction area.

# **Property Acquisition**

Generally, none of the alternatives will require the acquisition of property. However, some of the alternatives involving the Streetcar mode may require the acquisition of property for a vehicle maintenance and storage facility. Most of the sites under consideration are publicly owned.

### **Conclusions**

Table 5 shows a summary of findings from the above environmental review. All of the alternatives show no significant issues. Under Air Quality, the issue is uncertainty as to whether the bus alternatives are included in the LRTP.







# Regional Alternatives Analysis: Downtown Corridor

**Table 4: Comparison of Alternatives** 

Environment	Bus Alte	rnatives	Streetcar Alternatives				
al Measure	Main Street Alignment	Grand Avenue Alignment	Main Street Alignment	Grand Avenue Alignment			
Visual/ Aesthetics	No catenary system	No catenary system	Overhead catenary system added to corridor	<ul> <li>Overhead catenary system added to corridor</li> <li>Catenary system may result in greater visual impact due to higher number of NRHP- eligible properties (see historic and cultural)</li> </ul>			
Air Quality	<ul> <li>Operation emissions - diesel engines would contribute emissions (CO, NOx, SOx, VOCs, PM).</li> <li>Construction emissions – fugitive dust and equipment (CO, NOx, SOx, VOCs, PM)</li> <li>Due to existing constrained roadway capacity, may require hot spot analyses at major intersections.</li> </ul>	<ul> <li>Operation emissions - diesel engines would contribute emissions (CO, NOx, SOx, VOCs, PM).</li> <li>Construction emissions – fugitive dust and equipment (CO, NOx, SOx, VOCs, PM)</li> </ul>	<ul> <li>Operation emissions - electric engines would contribute no emissions.</li> <li>Construction emissions – fugitive dust and equipment (CO, NOx, SOx, VOCs, PM)</li> <li>Due to existing constrained roadway capacity, may require hot spot analyses at major intersections.</li> </ul>	<ul> <li>Operation emissions - electric engines would contribute no emissions.</li> <li>Construction emissions – fugitive dust and equipment (CO, NOx, SOx, VOCs, PM)</li> </ul>			
Noise and Vibration	<ul> <li>Noise from buses would be similar to existing bus operations</li> </ul>	<ul> <li>Noise from buses would be similar to existing bus operations</li> </ul>	<ul> <li>Noise from Streetcar operations would be generally similar to trucks and buses operating in the streets</li> <li>Noise analysis would be necessary where there are sensitive receptors along the route such as Residential uses.</li> </ul>	<ul> <li>Noise from Streetcar operations would be generally similar to trucks and buses operating in the streets</li> <li>Noise analysis would be necessary where there are sensitive receptors along the route such as Residential uses.</li> </ul>			



# Regional Alternatives Analysis: Downtown Corridor

Environmental	Bus Alte	ernatives	Streetcar Alternatives				
Measure	Measure Main Street Alignment Grand Avenue Alignment		Main Street Alignment	Grand Avenue Alignment			
Historic and Cultural	<ul><li>19 NRHP-listed properties</li><li>13 NRHP-eligible properties</li></ul>	<ul><li>19 NRHP-listed properties</li><li>27 NRHP-eligible properties</li></ul>	<ul><li>19 NRHP-listed properties</li><li>13 NRHP-eligible properties</li></ul>	<ul><li>19 NRHP-listed properties</li><li>27 NRHP-eligible properties</li></ul>			
Parks (& Section 4(f)/6(f))	<ul> <li>1 park</li> <li>2 fountains</li> <li>1 trail crossing</li> <li>2 KCPRD pkwy/blvds</li> <li>No 6(f) properties</li> </ul>	<ul> <li>1 park</li> <li>1 trail crossing</li> <li>4 KCPRD pkwy/blvds (including Grand)</li> <li>No 6(f) properties</li> </ul>	<ul><li>1 park</li><li>2 fountains</li><li>1 trail crossing</li><li>2 KCPRD pkwy/blvds</li><li>No 6(f) properties</li></ul>	<ul> <li>1 park</li> <li>1 trail crossing</li> <li>4 KCPRD pkwy/blvds (including Grand)</li> <li>No 6(f) properties</li> </ul>			
Natural Resources	same	same	same	same			
Biological Resources	<ul> <li>Peregrine falcon nest, Commerce Tower</li> </ul>		<ul> <li>Peregrine falcon nest,</li> <li>Commerce Tower</li> </ul>				
Water Quality	same	same	same	same			
Prop. Acquisitions	none none		none	none			
Construction	There would be limited construction of new transit facilities with the bus alternatives	There would be limited construction of new transit facilities with the bus alternatives	<ul> <li>Construction of new trackway, stops, maintenance facility and related improvements</li> <li>Construction would be almost exclusively within the street right-of-way.</li> <li>Construction effects would be temporary and could take approximately 2 years overall, but could be shorter in any single location</li> <li>Key construction effects would be to traffic, parking and access to uses adjacent to the improvements</li> </ul>	<ul> <li>Construction of new trackway, stops, maintenance facility and related improvements</li> <li>Construction would be almost exclusively within the street right-of-way</li> <li>Construction effects would be temporary and could take approximately 2 years overall, but could be much shorter in any single location</li> <li>Key construction effects would be to traffic, parking and access to uses adjacent to the improvements.</li> </ul>			



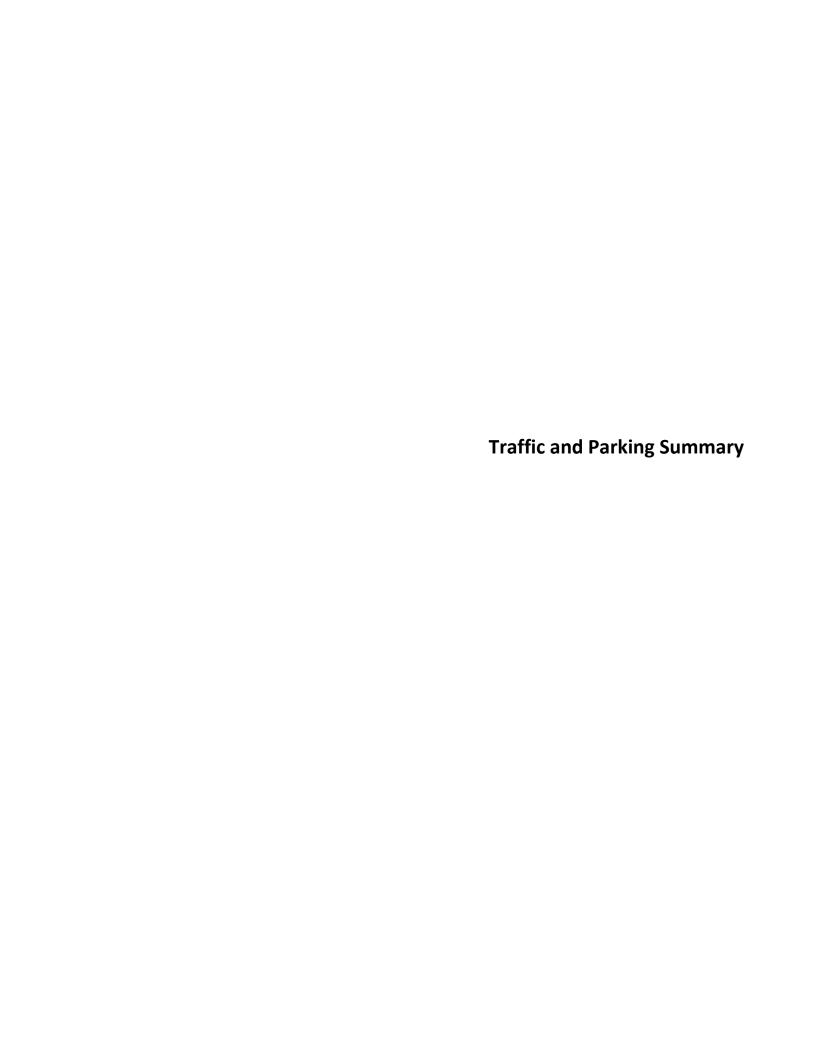


**Table 5: Summary of Environmental Review** 

Environmental Resource		Al	Comments			
	No Build	Bus	s	Street	car	
		Grand	Main	Grand	Main	
Location and Zoning						
Traffic and Parking						
Aesthetics						
Air Quality						
Coastal Zone						No coastal areas
Environmental Justice						
Hazardous Materials						
Navigable Waterways						
Noise and Vibration						
Prime and Unique Farmlands						
Biological and Natural Resources						No wetlands
Cultural and Historic Resources						
Parklands						
Seismic						
Water Quality and Hydrology						
Construction Impacts						
Property Acquisition						Only for maintenance facility

Key	No issues				
	Some issues				
	Issues				





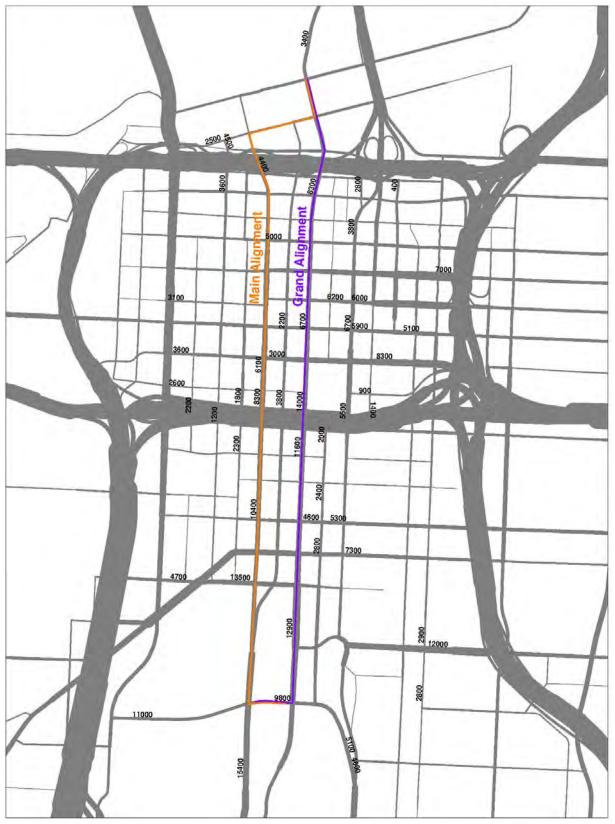
# **Traffic and Parking Summary**

Main Street and Grand Boulevard are the main north-south arterial streets within the study corridor. They are spine roads serving the heart of the Kansas City central business district. They also intersect with numerous important east-west streets over the two-mile study corridor.

As can be seen in Figure 1, Grand Boulevard ties into Riverfront Drive on the north end and runs south the entire length of the study corridor. North of the Downtown Loop, it is generally a two-lane street with parking on both sides. Within the Loop, it widens to a six-lane street; however, the outside lanes are often used for parking in this section. The recently reconstructed portions of Grand Boulevard near the Sprint Center carry four lanes, with left turn-lanes. South of the Loop, Grand Boulevard is again a six-lane street, with parking often occupying the outside lanes, until it reaches Crown Center/Pershing Boulevard. From Crown Center south, it is a four-lane roadway with left turn-lanes and no parking on either side. The speed limit on Grand Boulevard is 35 mph. Daily traffic volumes on Grand Boulevard range from approximately 8,000 vehicles at the north end of the Downtown Loop, to 14,000 vehicles near the Sprint Center. South of the Loop, the volumes are near 12,000 vehicles.

Within the Downtown Loop, Main Street varies in width from four to six lanes, with parking on both sides in many, but not all areas. There are few intersections with turn lanes. A southbound bus lane is marked from near 10<sup>th</sup> Street to the southern edge of the Loop. However, this lane is typically used by both buses and the general public even during the hours it is officially in operation. At the north edge of the Loop, Main Street passes over I-70 to connect with Delaware Street. Delaware Street continues north to 3<sup>rd</sup> Street. South of the loop, Main Street carries between two and three southbound lanes and between one and three northbound lanes, depending on the location. Again, part of the corridor has a marked southbound bus-lane and there is parking on one or both sides for part of this section. The speed limit on Main Street is 35 mph. Daily traffic volumes on Main Street within the Loop range from just over 4,000 vehicles near I-70 to over 8,000 vehicles at the south edge of the Loop. South of the Loop, the volumes increase to over 10,000 vehicles per day.

Figure 1: Study Area Traffic Volumes



# Regional Alternatives Analysis:

There are several major east-west cross-street pairs serving the Loop. One pair is 10<sup>th</sup> Street (one-way eastbound) and 11<sup>th</sup> Street (one-way westbound). This pair carries traffic to and from a series of I-70 / US-71 freeway ramps at the east edge of the Loop, as well as local destinations east of the Loop. A second pair is 12<sup>th</sup> Street (one-way eastbound) and 13<sup>th</sup> Street (one-way westbound). Of these two streets, 13<sup>th</sup> Street carries the larger volume of traffic because it has a direct ramp connection from I-70 westbound (on the east side of the Loop). 12<sup>th</sup> Street provides the only full-access interchange on the west side of the Loop. The one-way Truman Road sections that parallel I-670 at the south edge of the Loop provide another key pair of directional routes, with ramps to and from I-670.

South of the Loop, 19<sup>th</sup> Street (extending from Southwest Boulevard) and 20<sup>th</sup> Street provide an important connection to/from the west. 22<sup>nd</sup> Street provides a key link to the east (US-71 and beyond) and Pershing Road connects locations at the southern end of the corridor.

In the future, weekday traffic volumes on Main Street and Grand Boulevard are expected to increase due to continued downtown development and re-development. However, by opening day in 2015 it is not expected that traffic will increase by more than three to five percent. Thus, the current volumes with some modest background growth can be used for an initial planning level traffic operations analysis.

As part of this analysis, it is important to consider peak-hour capacity issues and how they would relate to new BRT or streetcar service on either Main Street or Grand Boulevard. This evaluation must also take into consideration parking plans for the corridor. Specifically, there are discussions regarding the elimination of peak hour parking restrictions on one or both streets. The current parking on Main Street and Grand Boulevard (by restriction type) is shown in Figure 2. This parking change could reduce the number of travel lanes (or at least through travel lanes) in one or both directions.

# **Streetcar Operations**

The streetcar vehicles would travel in a standard drive lane on either Main Street or Grand Boulevard. The streetcar would affect roadway capacity in a manner similar to a bus traveling in the drive lane, including lane blockages during passenger boarding and alighting. It would therefore not be expected to substantially reduce the roadway speeds or capacity when compared with bus operations.

What could affect roadway capacity is the manner in which parking is treated. Parking adjustments of some type would likely be required with the streetcar alternatives. Either parking would need to be eliminated, so that the streetcar can run in the outside curb lane, or the parking would need to be made permanent so that the streetcar is in the outside travel lane, with curb extensions (bump-outs) at stop locations. (A third option, locating the streetcar tracks within a flush median and providing station platforms in the median, would – from a parking perspective – operate as a hybrid of the two, allowing parking to remain flexible in one direction.) Given the existing roadway capacity, in the two corridors, either option is feasible in the near-term. At a planning level, the near-term traffic volumes do not require more than two through lanes in either direction. Thus the third lane (where present) could be converted to full-time parking spaces without time of day restrictions. Where only two lanes are present, they may both be required. In addition, parking restrictions may be required to allow for turn-lanes at critical intersections. In the longer term there may be segments, especially within the Loop, where it is important to maintain a third continuous lane even if it is only for turning traffic. This would need to be investigated further in the detailed planning and design phases.

**Figure 2: Alignment Parking Locations** 



# Regional Alternatives Analysis:

Overall, based on the current traffic volumes in both corridors, it appears that there is sufficient capacity to support the addition of the streetcar in either corridor. If parking adjustments are made such that only two lanes are available in both directions on the street to be served by the streetcar, then placing the streetcar on Main Street would be preferred as it has lower current and projected future volumes. However, if parking is to be removed from Grand Boulevard, then that street could better accommodate the streetcar from a roadway capacity standpoint. Conversely, that removal of parking would potentially affect a number of businesses and downtown residents/visitors.

# **BRT Operations**

The BRT option would not require changes to all parking spaces along a block, but it would require adjustments that facilitate fast, high-frequency operations and clear stop locations. It is not expected that the BRT option would negatively affect either corridor in a substantial manner.



#### **Comparative Walking Environment Assessment**

The Kansas City Walkability Plan (LSA Associates, Inc., adopted March 2003) established five pedestrian level of service (LOS) measures to assess the walkability of the city, a community, a neighborhood, or a specific project: directness, continuity, street crossings, visual interest and amenities, and security. A comparative pedestrian assessment of the two proposed Tier 2 circulator corridor alignments will use the project specific pedestrian LOS criteria as established in the Walkability Plan. The measures in a project-specific assessment are generally defined as follows:

- Directness actual walk time compared to the minimum walk time characterized by a grid network.
- Continuity completeness of the pedestrian system with the avoidance of gaps, and integration with the project and surrounding uses; also includes ADA issues, separation of the sidewalk from the roadway with a landscaped buffer/planters, and maintenance issues.
- Street Crossings number of lanes to cross plus pedestrian crossing features such as crosswalks, pedestrian signal features, lighting, median refuge areas, and curb ramps. Signalized and unsignalized crossings are evaluated, as are midblock crossings.
- Visual Interest and Amenities aesthetic appearance of the facilities, including presence of landscape/hardscape, parkways, medians, street lights, and adjacent uses, as well as the maintenance of the facilities.
- Security visual line of sight, street lighting, and separation from vehicles.

For the purposes of this evaluation, the two corridors were divided into five districts, as follows:

- 1. Union Station/Crown Center represented by the area south of the bridge over the railroad tracks to Pershing Road.
- 2. Crossroads Arts District represented by the area between I-670 (Truman Road South) and the bridge over the railroad tracks.
- 3. Power & Light District represented by the area between 12<sup>th</sup> Street and I-670 (Truman Road South).
- 4. Financial District/North Loop represented by the area between I-70 and 12<sup>th</sup> Street.
- 5. River Market represented by the area between 3<sup>rd</sup> Street and I-70.

Each district was rated for each pedestrian LOS measure on a scale of good/fair/poor. While the Walkability Plan uses a rating scale from A to F, the good/fair/poor rating simplifies the scale, with LOS A-B representing good, LOS C representing fair, and LOS D-F representing poor. The rating assessment for each corridor for each pedestrian LOS measure is summarized as follows:

#### <u>Directness</u>

The directness of the pedestrian network in each district on each corridor was assessed as good because each area has a grid network within one-quarter mile of the proposed corridors and transit stations.

#### Continuity

Both corridors feature a complete sidewalk system along the proposed routes, with only a few minor sidewalk gaps in the system off of the corridors, primarily on the side streets. For this reason, both corridors generally received good ratings, although some specific areas received a lesser rating of fair. On both corridors, the Crossroads Arts District has more maintenance issues with cracked, broken, and overgrown sidewalks compared to other districts. The maintenance issues, as well as more numerous ADA issues in this district, led to a rating of fair. The one rating that differed in this category between the two corridors was within the Financial District/North Loop. This district was rated as good on Main Street, but was rated fair on Grand Avenue due to more numerous ADA and maintenance issues.

#### **Street Crossings**

Street crossings along each corridor can generally be rated as fair. The widths and crossings distances along the two corridors are similar, although Main Street is slightly narrower through much of its length. Both corridors provide similar pedestrian features, including marked crosswalks, countdown pedestrian signals, and curb ramps. Street crossings were assessed as fair in most districts because while features are provided to help pedestrians cross the street, there is room for improvement in many locations. Many crosswalk marking are faded, some pedestrian signals do not provide countdown indication, and a few signalized intersections do not provide any pedestrian signals at all. The majority of intersections use a single curb ramp per corner, and many ramps do not have detectable warnings. The district with the most complete street crossings is the Power & Light District. The Crossroads Arts District along the Grand Boulevard corridor received a rating of poor because there are two signalized intersections without pedestrian signals and more curb ramp issues compared to the Main Street corridor, which was rated fair.

#### **Visual Interest and Amenities**

Although the aesthetic appearance of the pedestrian facilities along the two corridors could generally be rated overall as fair, the ratings within the various districts range from good in the Union Station/Crown Center, Power & Light, and River Market Districts, to fair in the Financial District/North Loop, to poor in the Crossroads Arts District. Both corridors provide similar levels of lighting, landscaping, and maintenance, and no rating distinction was judged between the two corridors in each district.

#### Security

Security along the two corridors was generally judged to be good, based on lighting, and generally unobstructed lines of sight. Further, while most of the sidewalks are located at the back of curb and the majority of the corridors do not have planters or landscape buffers, the widths of the sidewalks and frequent presence of on-street parking provide sufficient separation from traffic. Again, no distinction was observed for this category between the Main and Grand corridors for each of the districts.

#### **Comparative Bicycling Environment Assessment**

The bicycling environment along the two Tier 2 corridors is assessed based on two measures: existing bicycle parking facilities and the general bicycle environment and connection, which includes the various traffic and roadway geometric characteristics discussed previously.

Although bicycle parking would likely be improved along the selected corridor through the incorporation of bicycle racks at the circulator stations, the level of existing bicycle parking is a good measure of the overall bicycle friendliness of the corridor. Unfortunately, bicycle parking facilities are generally sparse to non-existent along much of the two corridors, and neither corridor was clearly better than the other in any of the districts. As such, the overall rating for both corridors is poor, although the districts within the loop were marginally better at a rating of fair.

The current bicycling environments along the two corridors are very similar, both in terms of the traffic and roadway characteristics. No designated or exclusive bicycle facilities are provided today on either corridor or any of the cross streets. Although the current configurations of the two corridors would likely only attract experienced, confident cyclists, the environments are fair for bicycling. The multi-lane configurations in particular make it easier for motorists to pass cyclists, even those that are controlling a lane. Due to the similarities of conditions and characteristics on the two corridors, no distinction can be made between the bicycling environment and connections along the two corridors.

			Main Street						Grand Boulevard						
			Pedestrian Level of Service			Bicycle Level of Service Pedestrian Level of Service				Bicycle Level of Service					
					Visual			Bicycle				Visual			Bicycle
				Street	Interest &		Bicycle	Environment			Street	Interest &		Bicycle	Environment
District	Limits	Directness	Continuity	Crossings	Amenities	Security	Parking	/Connections	Directness	Continuity	Crossings	Amenities	Security	Parking	/Connections
Union Station/ Crown Center	Pershing Rd to RR Tracks	Good	Good	Fair	Good	Good	Poor	Fair	Good	Good	Fair	Good	Good	Poor	Fair
Crossroads Arts District	RR Tracks to Truman Rd South	Good	Fair	Fair	Poor	Fair	Poor	Fair	Good	Fair	Poor	Poor	Fair	Poor	Fair
Power & Light District	Truman Rd South to 12th St	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Good	Good	Good	Fair	Fair
Financial District/ North Loop	12th St to I-70	Good	Good	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair	Good	Fair	Fair
River Market	I-70 to 3rd St	Good	Good	Fair	Good	Good	Poor	Fair	Good	Good	Fair	Good	Good	Poor	Fair
Overall Tier 2 Route Alignment		Good	Good	Fair	Fair	Good	Poor	Fair	Good	Good	Fair	Fair	Good	Poor	Fair

#### **General Walking Environment Assessment**

The Tier 2 corridors both provide generally good and similar walking environments. Sidewalks are provided along all portions of both the Main Street and Grand Boulevard alignments, as well as crossing streets. However, the quality of these facilities varies. In some locations, such as the Power and Light District, the quality of the walking environment is very high, but in others, such as in the Crossroads Arts District, the walking environment is significantly poorer in terms of the quality of the facilities and aesthetics. In order to support a safe, efficient, and inviting walking environment in the areas around the potential downtown circulator route, improvements will be needed to improve the sidewalks and pedestrian crossings in many locations.

## **General Opportunities for Improvement:**

- Sidewalk Quality some areas provide excellent quality sidewalks with smooth concrete, shade, land-scaping, and other amenities (Photo 1 shows 14th Street, east of Main Street), but in other areas, sidewalks are badly cracked, uneven, overgrown, or covered in gravel (Photo 2 shows the Main Street sidewalk on the west side of the street, north of 18th Street). Pavers are used for the sidewalks in some areas, and where there are street trees, sidewalk pavers are uneven in some areas, which could be a tripping hazard or challenging to use for pedestrians with disabilities.
- Curb Height curb heights are very low in some places due to street overlays that occurred without pavement milling and extend over the top of gutter pans (Photo 3 shows a low curb on Grand Boulevard just south of 20th Street). These locations are less safe for pedestrians as motor vehicles can more easily encroach onto sidewalks.
- Single versus Dual Curb Ramps there are many locations where only a single curb ramp is provided on an intersection corner, but two curb ramps per corner would be preferred, particularly where corner radii are small (Photo 4 shows a corner with a single ramp at Grand Boulevard and 20th Street where a person in a wheelchair would have to move outside the crosswalk to access the ramp). Corners with a single ramp can be challenging for persons in wheelchairs or with vision disabilities, and often force a









- pedestrian into traffic. In some locations, the use of a single ramp per corner has resulted in the marked crosswalks not properly aligning with the ramps.
- Curb Ramp ADA Issues there are several locations along the two corridors which have intersection corners that are missing curb ramps (Photo 5 shows the southeast corner of the Grand Boulevard/9th Street intersection does not have curb ramps). There are many more existing curb ramps that do not contain detectable warning strips (Photo 6 shows a curb ramp at Main Street and 10th Street without detectable warning), or have the detectable warnings placed improperly (Photo 7 shows incomplete placement of detectable warnings at Grand Boulevard and Truman Road South; detectable warnings are required for the full width of the ramp or uncurbed connection to the crosswalk). Further, there are still other locations where the grade of an existing curb ramp is too steep and does not meet ADA guidelines, including one ramp at the 10th and Main Transit Plaza (Photo 8).
- Other ADA Issues several locations between intersections were observed with ADA issues, including ledges/drop-offs along the sidewalk (Photo 9 shows a ledge located on Grand Boulevard south of 20th Street).
- Crosswalk Markings all intersections along the two corridors relied on transverse lines as the markings for crosswalks. This type of marking does not stand out well among other pavement markings, compared to other crosswalk marking options such as zebra or ladder style markings. Further, the existing transverse crosswalk lines were badly faded or had been paved/patched over and not replaced (see Photos 5-6 for examples).
- Pedestrian Signals along the two corridors, pedestrian countdown timers are the predominant type of pedestrian signal. However, there are some intersections along the two corridors whose pedestrian signals do not have countdown timers, and there are some signalized intersections along the southern portion of the Grand Boulevard corridor that do not have any pedestrian signals at all, although they do have marked crosswalks (Photo 4 shows there are no pedestrian signals at Grand Boulevard and 20th











Street). Locations without pedestrian signals are difficult for pedestrians to cross, as they may have to wait for a vehicle to be detected before the primary street traffic is required to stop, may not know when it is safe to cross without the pedestrian signals, and may not have adequate time to cross safely without proper pedestrian clearance intervals.

- Pedestrian Signal and Push Button Locations there were a number of locations observed where the pedestrian push button was not located conveniently to the curb ramp and crosswalk (Photo 10 shows a push button located about 15 feet from the edge of the crosswalk at Grand Boulevard and 9th Street). Push buttons at these locations were generally located on the closest available signal pole, but could be improved by locating them on a separate pole used exclusively for the push button. Some intersections placed the pedestrian signal heads in poor locations where they could be blocked by vehicle traffic or were not on a good line of sight adjacent to a crosswalk (Photo 11 shows a pedestrian signal head located well away from the crosswalk and general pedestrian line of sight on the south leg of the Grand Boulevard/Pershing Avenue intersection; Photo 12 shows a truck completely blocking the view of the pedestrian signal head on the north leg of the same intersection).
- Missing Crosswalk several locations were observed at which pedestrian signals were provided, but without crosswalk markings (an example is shown in Photo 13 on the north leg of the Grand Boulevard and 6th Street intersection). Signalized intersections where pedestrians are permitted to cross should include both crosswalk markings and pedestrian signals.
- Wide, Challenging Intersections there are some large intersections near the north end of the two corridors, particularly near I-70, that are very large and particularly challenging for pedestrians to cross (Photo 14 shows the Main Street/7th Street intersection, which has a very wide single lane ramp without features to help pedestrians cross, including a marked crosswalk). Large intersections should be redesigned to minimize the exposed crossing distances of pedestrians by adding or widening channelizing islands and medians, narrowing travel lanes if











- possible, providing curb bulb-outs, and narrowing undesignated space.
- Existing Midblock Crossings there is an existing midblock crosswalk located on each of the two corridors just north of 14th Street in the Power and Light District which is marked with transverse crosswalk markings, advance yield lines, and yield here to pedestrians signs. On Grand Boulevard, the yield here to pedestrians sign in the northbound direction is obscured by the street trees (Photo 15). These crossings of four-lane undivided roadways are not very visible and should ideally be supplemented with additional treatments to help drivers identify the potential for crossing pedestrians. Such treatments could include warning beacons/flashing lights that would activate only when a pedestrian or group of pedestrians was about to cross; the lights could be postmounted on the sides of the roadway or overhead. Variations of this type of treatment that may be appropriate supplements at these two midblock crossings include Rectangular Rapid Flashing Beacons (RRFBs) (Photo 16 shows an RRFB in St. Petersburg, FL) and Pedestrian Hybrid Beacons, also known as HAWK crossings (Photo 17 shows a Pedestrian Hybrid Beacon in Phoenix, AZ).
- Potential Midblock Crossings With the grid street pattern in downtown Kansas City and the majority of intersections being signalized, there are generally ample and safe street crossing opportunities for pedestrians along the two corridors. However, in locations where circulator stations are likely to be placed away from signals, many pedestrians may choose to cross the street to get to or from the station at a midblock location. One such potential location is the existing MAX Union Station BRT station located on Main Street approximately 300 feet north of Pershing Road. Several pedestrians were observed crossing the street at-grade at this location, despite the adjacent LINK covered pedestrian bridge over Main Street (see Photo 18). Because most pedestrians will not walk more than 150 feet out of their way to cross the street, and many more will cross where they deem to be most convenient for them, this location may be a good place for a midblock crosswalk, or at minimum an informal median refuge island. Midblock crosswalks or informal median refuge islands should be









- considered at other locations where the circulator stations may be located away from a signal.
- Circulator Stations at Unsignalized Intersections —
  there are a few locations where potential circulator
  stations included in Tier 2 would be located near unsignalized intersections, including 16th Street at either Main Street (Photo 19) or Grand Boulevard.
  These locations should be considered for future signalization or additional pedestrian crossing treatments, such as the RRFB or Pedestrian Hybrid Beacon.



The assessment of the bicycling environment for the downtown circulator must account for two aspects:

- Providing connections for bicyclists to transit stations, where they may either take their bike on the bus/streetcar, or lock it on a rack or in a bike locker.
- 2. Accommodating through bicyclists on the streets serving the downtown circulator, particularly at stations.

Neither of the Tier 2 corridors or cross streets currently provide designated or exclusive bicycle facilities. Despite this, bicyclists can use Main Street, Grand Boulevard, or any of the cross streets today as a part of the overall traffic flow in shared lanes. A small number of cyclists were observed using one of the proposed corridors or cross streets, and generally rode in outside portion or center of the outside travel lane. **Photos 20-22** show bicyclists on Main Street at 5th Street, 19th Street east of Main Street, and Main Street north of Pershing Road, respectively.

Factors that make a particular roadway attractive to cyclists include its traffic characteristics (traffic volume, traffic speed, percentage of truck traffic, presence of onstreet parking), physical and geometric characteristics (presence of an exclusive bicycle facility or designation as a bicycle route, number of lanes, lane widths, pavement quality/smoothness, and roadway grades), and proximity to origins and destinations, as well as to end use facilities such as bike racks (**Photo 23** shows an "inverted U" bike rack on Main Street at 12th Street). With respect to these characteristics, Main Street and Grand Avenue offer similar environments for bicyclists today.











In terms of future bicycle accommodations, Grand Boulevard is proposed in the Bike KC plan as a bicycle route, but only along less than half of the proposed circulator alignment, between 3rd Street (the northern terminus of the circulator corridor in both route alternatives) and 12th Street. The portion of Pershing Road between Main Street and Grand Boulevard, which is included in both circulator alignment alternatives, is also shown as a bicycle route. Other bicycle routes proposed in the Bike KC plan that directly connect to or cross one or both of the Tier 2 circulator alignments are:

- Grand Boulevard, north of 3rd Street
- 3rd Street, west of Grand Boulevard
- 5th Street, east of Grand Boulevard
- 11th Street, crossing both Main Street and Grand Boulevard
- 12th Street, crossing both Main Street and Grand Boulevard
- 19th Street, crossing both Main Street and Grand Boulevard
- Grand Boulevard, south of Pershing Road

It is not clear whether the intent of the bicycle route designation in the Bike KC plan is signage only, or if any of these routes would have exclusive facilities (such as bike lanes or cycle tracks) or would also have bicycle markings (shared lane markings/"sharrows") in addition to signage.

Bicyclists can operate on streets with transit, although there is greater risk to cyclists when operating on a street with streetcar because bicycle wheels and tires are very susceptible to getting caught in the gap of the streetcar track flange. The track can trap a wheel when the wheel crosses the track at a low angle (typically less than 60 degrees); this typically leads to a potentially serious crash where the bicyclist is thrown from their bike. This situation makes providing bicycle lanes on streetcar routes challenging, particularly if the streetcar tracks and stations are on the right side of the roadway, rather than in the center or left side (as would be the case for either of the two route alignments). A bicycle lane provided to the right of a lane containing streetcar tracks cannot pass between the streetcar track and the curb at a streetcar station because the streetcar track must be located directly adjacent to the curb at the stations. Maneuvering the bicycle lane to the left of the streetcar track at the stops would require the bicyclist to cross the track at very low angles, increasing the potential for bicyclist crashes. The City of Portland, Oregon has accommodated bicycle lanes at the streetcar stops by ramping the bicycle lane up to the sidewalk level and directing cyclists behind the stop/station platform and shelter (Photos 24-25). The bicycle lane then ramps back down to street level once past the streetcar stop (Photo 26). Although this configuration avoids a conflict between bicycles and the streetcar tracks, it creates another potential conflict between







# Regional Alternatives Analysis:

### Tier 2 Alternatives: Bicycle & Pedestrian Assessment

bicyclists and pedestrians crossing the bike lane between the sidewalk and the stop/station platform. Another station configuration used in Portland with bike lanes keeps the bike lane at-grade while the station platform is higher (**Photo 27**); unfortunately, this configuration still has the same potential bicycle-pedestrian conflicts.

Care must also be taken where rail tracks cross the path of a bicycle lane or signed and marked bicycle route, particularly if the tracks cross the bicyclist's path at an angle. In some cases, the standard bicycle lane or bicycle markings can be modified to accommodate a rail crossing that is as close to 90 degrees as possible (**Photo 28** shows an example from Portland). In addition, warning signs can be posted alerting those on bicycles to the dangers posed by the tracks (**Photo 29** shows an example from Portland).

It should be noted that even with appropriate provisions for bicycle lanes at streetcar stations, there still is an increased risk of bicycle crashes at any other point along a route shared with streetcar any time a bicyclist may need to leave the bicycle lane, such as to make a left turn or avoid a hazard. The same risks would exist if a roadway with streetcar was designated as a bicycle route with signage and/or shared lane markings as the bicyclist would generally be using the same lane as the streetcar tracks (the outer most lane). With the inherent risk associated with mixing bicycles and streetcars (particularly with right side tracks and stations), it is generally recommended to only consider designated bicycle routes or exclusive bicycle facilities on parallel corridors or crossing corridors.

If the chosen circulator technology were enhanced bus, bicycle facilities could be co-located on the same corridor. If there are exclusive bus lanes, bicycles can share such lanes (**Photo 30** is an example from Philadelphia). Alternatively, buses can temporarily pull into bicycle lanes at transit stops (**Photo 31** shows an example); bicyclists can easily pass stopped buses within the outside lane to the left of the bus.















# DRAFT PUBLIC PARTICIPATION PLAN









May 2011







# **CREDITS**

# **Prepared For the Partnership Team of:**

The City of Kansas City, Missouri Kansas City Area Transportation Authority Mid-America Regional Council Jackson County, MIssouri





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# INTRODUCTION TO DOWNTOWN CORRIDOR ALTERNATIVES ANALYSIS

# **Purpose and Need**

Local officials and transit providers throughout the Kansas City metropolitan area have been working on the planning and implementation of an expanded regional transit system – the regional transit vision, known as Smart Moves, identifies a combination of urban and commuter service needs. In order to further the implementation of Smart Moves, a Partnership Team comprised of representatives from the City of Kansas City, MO; Kansas City Area Transportation Authority (KCATA); Mid-America Regional Council (MARC); and Jackson County, MO jointly submitted a proposal for Alternatives Analysis (AA) funds through the Federal Transit Administration (FTA) to conduct two separate but coordinated AAs for a Downtown Corridor in Kansas City, and two adjoining Commuter Corridors in Jackson County.

The Consultant Team for the Downtown Corridor is led by HDR and supported by Nelson/Nygaard; Polsinelli Shughart; Patti Banks Associates; HG Consult, Inc; Burns & McDonnell; and Architectural and Historical Research.

This analysis will be conducted per a federally-prescribed process, positioned to advance a Locally Preferred Alternative (LPA) that helps improve corridor accessibility, better connect our major activity and employment centers, and elevate the quality and functionality of our regional transit system. The Federal Transit Administration is financially supporting the Downtown Corridor AA, which is a required step in becoming eligible for federal funds for building a preferred project.

The AA will compare modern streetcars, with buses and "no build" alternatives leading up to the identification of an LPA. This Locally Preferred Alternative will include selecting the type of transit the community wants in this corridor, the route it should follow, and preferred financial strategies to support construction and operations. The financing options will focus on creating partnerships to leverage funding from groups near the preferred corridor, rather than through a city-wide initiative.

### Components of this AA include:

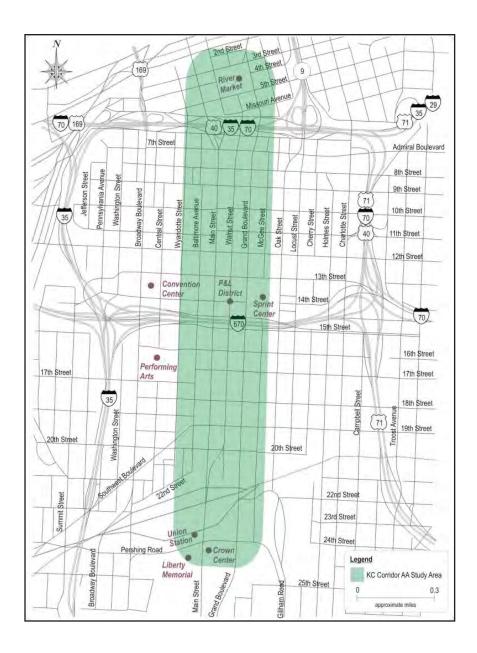
- Identifying the best downtown circulator alignment within the study area and confirm the chosen transportation mode;
- · Assessing the cost, impact and budget of different options;
- Developing a viable capital and operations financial plan to secure funding for implementation and potentially apply for federal funding through New Starts, Small Starts, or other federal sources;
- Successfully engaging the local business and stakeholder community.

# **Previous Study Efforts**

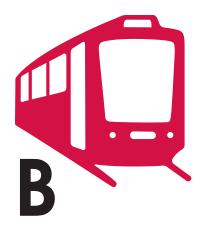
The result of this AA will be a starter line for Kansas City's future expanded regional system. Previous study efforts have been conducted that examine the feasibility of downtown transit services, but those studies did not succeed in securing voter approval for picking a single starter project and a feasible financial plan to pay for capital, operations, and maintenance. The Partnership Team will build on these previous efforts with community support, representing the best opportunity for developing a successful starter-line which could be a critical building block for more extensive regional transit system improvements. The Downtown Corridor AA will conclude in the selection of an LPA, including selecting both the type of transit the community prefers, as well as the route it will follow and recommended financial plan.

# **Study Area**

The Downtown Corridor study area, as defined by Kansas City Council resolution for the FTA grant application, extends as a narrow two-mile corridor from River Market on the north, through the Central Business District and the Crossroads areas to Union Station and Crown Center on the south.



Downtown Corridor Study Area Map



# WHY IS PUBLIC PARTICIPATION IMPORTANT?

# Foundation of Public Participation in Planning

Public participation is based on the belief that people whose lives are affected by planning and investment decisions have a right to be involved in the decision-making process and influence choices that are made. Directly engaging citizens in this process promotes successful problem solving, yields diverse voices and new ideas, and gives the public a sense of ownership of the developed solutions.

Public participation must be a proactive process in which governing bodies strive to find innovative ways to identify and engage the affected public, provide a wide variety of opportunities for interested parties to become involved, and create a meaningful process that is transparent and ensures effective communication about how public contribution influences decisions. It is also important that a public participation process be continuously evaluated and improved to ensure that all impacted communities are given a voice.

## The Partnership Team is committed to a public participation process that:

- Involves the public in decisions that affect their lives.
- Ensures that the public's contribution will influence decision making.
- Communicates how the public's contribution will influence decisions.
- Is adaptable and sensitive to diverse audiences.
- Promotes respect.
- Provides equal access to opportunities, information and education.
- Ensures timely response to participants.
- Is consistent and reliable.
- Promotes continued engagement.
- Allows for flexibility and use of creative approaches.
- Maintains honesty and integrity throughout the process.
- Continuously strives to educate and inform affected and interested parties to give them a more meaningful participatory experience.
- Encourages early and active participation.
- Involves process evaluation and monitoring tools.

# The Partnership Team

Representatives from the City of Kansas City, MO; KCATA, MARC, and Jackson County, MO will work together throughout the process as a foundation of partners. This Partnership Team was created through the joint submittal of the FTA grant to study the Downtown Corridor - each member of the Partnership Team has a vision of promoting the economic viability of Downtown Kansas City through the success of a Downtown circulator. In addition, the Partnership Team will continue to coordinate the Downtown Corridor AA in conjunction with planning efforts for the future Commuter Corridor projects. The roles of the Partnership Team for the Downtown Corridor AA are highlighted below, with the City of Kansas City ultimately acting in the lead decision-making role.

- City of Kansas City, MO: Lead Local Government Partner
- KCATA: Technical Support
- **MARC:** Grant/Project Administrator
- Jackson County, MO: Local Supporting Efforts

# Purpose of the Public Participation Plan

The Partnership Team seeks to provide opportunities for input to interested parties, as well as engage members of the community who may not have been traditionally involved. The purpose of this Public Participation Plan is to provide a framework from which to guide the public participation process for the Downtown Corridor AA. The Partnership Team's underlying goals as well as strategies and techniques for public participation will be considered, as well as strategies for reaching our various target audiences.

The Public Participation Plan:

- · Shall be developed in consultation with all interested parties; and
- Shall provide that all interested parties have reasonable opportunities to comment on the contents of the Alternatives Analysis.

In carrying out these required elements of the Public Participation Plan, the Partnership Team shall, to the maximum extent practicable:

- Hold public meetings at convenient and accessible locations and times;
- Employ visualization techniques to describe plans;
- Make public information available through electronic formats, a variety of media outlets, written documentation, and other accessible formats as requested by members of the public.

The purpose of this plan is to provide a framework from which to guide the public participation process for the Downtown Corridor Alternatives Analysis.



# **GOALS FOR PUBLIC PARTICIPATION**

Public outreach should be timely, useful and used! For the Downtown Corridor AA, public involvement will be implemented at multiple levels with the overall goal of building stakeholder support for the LPA and future financing plan.

This Public Participation Plan outlines activities, materials, and strategies that could, when implemented, function as an integrated outreach program and provide the needed education support for the Downtown Corridor AA. Patti Banks Associates (PBA) will assist the Partnership Team with implementation of an approach to public involvement that focuses on continuing contact, and reaching targeted stakeholder groups.

## We plan to:

- Maximize outreach opportunities and increase responsiveness to key issues and concerns.
- Raise awareness with the public and our stakeholders about the purpose and need of this AA and how it differs from previous study efforts.
- Improve general understanding about the difference in fixed guideway alternatives, namely difference between streetcar and light rail transit.
- Build support for the Downtown Corridor AA and its resulting Locally Preferred Alternative.
- Explain the various financing strategies available and build consensus on a feasible financial plan for the preferred alternative.

## Opportunities for input on elements of the AA include:

- Identification of alignment and transit mode alternatives.
- Recommended LPA.
- Available financing strategies and preferred financing plan.



# TARGET AUDIENCES

Because of the diverse target audiences who will be participating in the planning process, the Partnership Team will address these groups in various ways, working together to identify, target, and strategize on how to engage our audiences.

Stakeholders is a broad term used to describe individuals or groups who are affected by, or have an interest, in a particular project or action. In this context, a variety of stakeholders will be interested in the Downtown Corridor AA, including the general public, property owners and residents along potential corridors in the study area, business groups, developers, utility companies, emergency service providers, umbrella organizations (Chambers, Councils, Commissions, etc), and elected and appointed officials at all levels of government.

## Different tactics are necessary to understand, analyze, and inform all audiences:

- *First*, it is recommended to focus project efforts on *key stakeholders and individuals or small groups* to create a broader positive base of support. This will require identifying the various stakeholders that could or should be involved, and those that can best help achieve program objectives. Some of these stakeholders will be located within the AA study area, others will be identified outside of the study area but are as equally important.
- **Second**, raising general **public awareness** by informing the public that their input matters and how it relates to their daily lives.

With assistance from the Partnership Team, PBA will compile a detailed database of stakeholder groups, contact information, and meeting schedules for outreach. Additionally, PBA will work with the Partnership Team to develop a mailing list of property owners, businesses, and residents along selected corridors of the study area. PBA will use this list to schedule meetings, email project updates, and advertise public involvement opportunities.



# PROCESS AND TIMING

The Downtown Corridor AA planning process began in April 2011 and is expected to conclude with the Final AA Report in late December 2011. Public input for this project will happen over the course of the planning process, particularly at key project milestones. The Partnership Team will conduct outreach by meeting with key stakeholders, targeted individuals and small groups, and the public throughout the project to share progress and obtain feedback, and will issue a coordinated series of print materials and project updates throughout the project's duration to share information.

## *Key milestones include:*

- June 2011 Project Goals and Objectives, Purpose and Need, Identification of Alternatives.
- **September 2011** Detailed Alternatives Assessment (Scoring, Cost Estimation, Environmental Screening), Financial Assessment, Locally Preferred Alternative.
- November 2011 Draft AA Report.
- December 2011 Final AA Report.



# TOOLS FOR REACHING OUR AUDIENCES

As the Partnership Team works with the target audiences, it is important to remember that everyone learns in different ways, and that people have preferred methods of learning new information. Whether the audience is 100 people or a thousand people, a mix of mass communications methods and community-based approaches will yield the best results. Selection of the best delivery system for the message to the target audiences is critical for success.

#### Factors to be considered include:

- Size and type of audience in this case: **key stakeholders, individuals and small groups, and the general public**.
- · Geographic distribution.
- Level of awareness and education.
- Preferred formats.

Mass media approaches such as television, radio, and newspapers can be very effective to spread the word, but it is the more in-depth, person-to-person communication that brings about understanding and support.

### With both types of delivery, we strive to:

- Inform the community of the project, its timeframe, challenges, decisions to be made, and how it will impact them.
- Gain understanding and support for project funding strategies used for implementation.
- Solicit input on the Locally Preferred Alternative and financing strategies.
- Develop close-knit relationships with audience members for implementation.

Today, effective public awareness and education efforts utilize a combination of technologies and methods to be relevant, create interest, provide resources, and to maintain relationships. Tools and techniques for reaching our various audiences are discussed in this Section.

## All audiences will be briefed at key project milestones, including:

- **June 2011** to discuss project goals/objectives, purpose and need, and identification of alternatives.
- **September 2011** to discuss detailed alternatives assessment, financial assessment, and Locally Preferred Alternative.
- **November 2011** to present the draft AA Report (as determined necessary the Partnership Team may decide to consolidate presentations to stakeholders and other groups at this final milestone).

# Meetings with the Partnership Team

The Partnership Team will meet monthly with the Consultant Team to gain input on the AA, discuss project status, and other outstanding issues. These meetings will be coordinated by HDR and the Partnership Team. Attendance of Partnership Team members during these blocks of time will reflect level of effort at particular project milestones. In between these monthly in-person information meetings, the Consultant Team will conduct conference calls with the Partnership Team to discuss project status and other timely updates.

# **Meetings with Stakeholders**

It is anticipated that members of the Partnership Team will coordinate meetings with public officials and civic leaders or other special interest groups prior to meeting with other stakeholder groups and the general public. The City's Parking and Transportation Commission will act in an advisory manner for this project, and will be kept informed through monthly updates.

Regularly scheduled municipal meetings, Chamber of Commerce meetings, Council meetings, etc. will be used as a platform to share information and identify issues with elected/appointed officials and community leaders. Presenters will include members from the Partnership Team and/or Consultant Team, as determined in advance of each meeting. Written notes will be provided by a member of the Partnership Team or Consultant Team in attendance at each meeting. PBA, in coordination with the Partnership Team, will develop a working calendar of scheduled stakeholder meetings. This working calendar will be updated periodically.

In the event that an interested stakeholder group (not already included in the working calendar) would like to set up a time for a presentation, they will have the option to do so by contacting Triveece Harvey at PBA to schedule this meeting. Ms. Harvey's contact information will also be posted on the project's webpage. PBA will then coordinate such meeting requests with the Partnership Team to see who will be in attendance and giving the presentation.

### PBA contact to schedule other stakeholder presentations:

**Triveece Harvey**, AICP

**Email:** tharvey@pbassociates.com **Telephone:** 816-756-5690 ext 3038

# Meetings with Individuals and Small Groups

In order to better respond to stakeholder concerns such as access management, financing, and economic development, the Partnership Team and/or Consultant Team will conduct individual or small group meetings with these parties to talk with them about their specific issues. The meetings will be held "kitchen table style" and held at a time and location that is convenient to the invitees. PBA will work with the Partnership Team to contact these individuals/groups via email or phone to confirm interest in participating in the discussion and to set a date, time, and location; other members of the Partnership Team and/or the Consultant Team will staff and support these meetings. Similar to scheduling the stakeholder presentations, if there are interested individuals or small groups not already contacted by the Partnership Team that would like to schedule a meeting, they can contact PBA to set this up. PBA will then coordinate such meeting requests with the Partnership Team to see who will be in attendance and giving the presentation.

## PBA contact to schedule other individual or small group presentations:

**Triveece Harvey**, AICP

**Email:** tharvey@pbassociates.com **Telephone:** 816-756-5690 ext 3038

# Open Houses for the General Public

A total of three public open houses will be held for this project, scheduled around integral milestones. They serve to provide information to the public regarding the Downtown Corridor AA, gather thoughts on the Locally Preferred Alternative, gain input on the financing strategies available for this project, and inform the public on recommendations made in the Draft and Final AA.

• *Timing and Staffing*: Each two-hour open house will be held in the late afternoon to early evening for the general public and media. Representatives from the Partnership Team and Consultant Team will staff the meetings during the entire period to talk individually with citizens about the project and their concerns.

- *Materials*: PBA will provide the Consultant Team with a graphic template for display boards HDR will be responsible for production of boards related to technical elements of the AA; PBA will be responsible for creating and producing a Welcome Board, Process and Timeline Board, Contact Board, and others related to public education. PBA, in coordination with the Partnership Team for content, will design and produce handouts for each public meeting summarizing the current status of the project, schedule, feedback from the community, and more.
- **Notice**: In advance of scheduled public open houses, PBA will provide the Partnership Team with display ads that can be posted online and emailed to our database. Additionally, PBA will design and deploy display ads for The Kansas City Star. In the event the Partnership Team wishes to advertise with other media outlets, PBA will work with the Team to design those ads. The Partnership Team will utilize other methods of online media as appropriate to advertise meetings. Flyers announcing the upcoming meetings may be distributed throughout area businesses along the corridors.
- **Documentation**: PBA will provide photography for each open house. PBA will also summarize the questions/comments asked by the general public at each area of display for posting on the project webpage.

Three public open houses will be held, scheduled around integral project milestones.

#### Open House #1

Open House #1 will be scheduled for June 2011 to share with the public the project goals and objectives, purpose and need of the Downtown Corridor AA, and to get feedback on the alternatives identified. Informational exhibits will focus on educating the public on the purpose of the AA, how it differs from previous efforts, the planning process, differentiation between a streetcar and light rail, preliminary remarks on financing, and how the LPA will be implemented. A formal presentation will be given by the Consultant Team at two scheduled times throughout the open house. PBA will prepare an exercise/handout to gain input on the various alternatives and early thoughts on funding strategies.

#### Open House #2

Open House #2 will be scheduled for September 2011 to inform how all the alternatives were screened resulting in the Locally Preferred Alternative, and find out from the public their views on feasible financing strategies that could pay for capital and operations. Informational exhibits will touch on elements shown at Open House #1, but will focus on educating the public on the screening process used to select the LPA, and detailed financing strategies that may prove to make the most impact in securing funds for implementation. A formal presentation will be given by the Consultant Team at two scheduled times throughout the open house. PBA will prepare an exercise/handout tailored specifically to gaining input on these financing strategies, in addition to asking the public to confirm the selected LPA and its screening process. If coordinated by the Partnership Team, participants of the Open House could be taken in shifts on a guided walking tour or bus tour of the preferred corridor to learn and visually see why that particular corridor was selected.

#### Open House #3

Open House #3 will be scheduled for November 2011 to provide citizens and stakeholders an opportunity to share feedback about the official draft plan recommendations developed for the Downtown Corridor AA. Informational exhibits will touch on elements shown at the previous two open houses, but will focus on recommendations proposed in the AA and next steps for implementation. A formal presentation will be given by the Consultant Team at two scheduled times throughout the open house. PBA will prepare an exercise/handout for participants to confirm what the Partnership Team has heard from the community, including a recommendation that the Downtown Corridor AA is approved for implementation.

# **Graphic Identity**

A creative and consistent blueprint will be prepared resulting in the design of a graphic identity (fonts, colors, templates) that identifies the Downtown Corridor AA and builds off the look of MARC's Smart Moves plan. This graphic identity will carry forward through all distributed materials. PBA will create the graphic identity in coordination with the Partnership Team. PBA will use this graphic identity to provide templates of documents including memos, summaries, project correspondence, Powerpoint presentations, and display boards.

## **Project Website and Visualizations**

MARC will host, manage, and maintain a project webpage for the Downtown Corridor AA within their Smart Moves website, located at **www.kcsmartmoves.org**. PBA will provide project materials, meeting invitations, etc. in the form of PDFs so the general public can view and download the information as necessary. HDR will provide MARC with various visualizations to graphically explain fixed guideway systems and their integration in the Downtown street network.

#### **Media Relations**

PBA, with cooperation from the Partnership Team, will produce and help distribute a series of media kits throughout the project's duration. These kits will contain media releases, fact sheets, visualizations, display ads (as appropriate), Frequently Asked Questions, and a list of Partnership Team contacts that provide updates on significant project milestones. The kits will provide a single, fluid resource for reporters putting together a story, and may also be appropriate for certain public officials or other parties who request in-depth information about the project. PBA will forward a copy of each media kit to the Partnership Team for comment. Sherri McIntyre, leading the City's role on the Partnership Team, will distribute the kit to print, broadcast, and internet media outlets as appropriate.

#### The preliminary schedule of media kit deployment is as follows:

- **May 2011 (1)**: Announcement of Downtown Corridor AA underway, introduction to the project, planning process, how it differs from previous efforts, ultimate goals of the AA.
- *May 2011 (2 Optional)*: Invite people to visit the streetcar on display at a pre-determined location, details of June open house.
- June 2011: Alternatives identified, June public open house.
- September 2011: Locally Preferred Alternative based on detailed assessment, cost estimates, financing strategies for implementation, September public open house.
- **November 2011**: Draft AA Report recommendations, November public open house.
- December 2011 January 2012 (based on completion of Final AA): City
  Council to pass resolution in support of Final AA Report and next steps for
  implementation.

If desired, PBA will work with MARC and the Partnership Team to coordinate the Downtown Corridor AA in conjunction with an airing of *Imagine KC*.

PBA is also available to write, with assistance from selected stakeholders such as representatives of Transit Action Network or others, one or more op-ed or feature newspaper articles on timely topics related to the AA.

## Fact Sheet and Frequently Asked Questions

PBA will graphically display HDR's one-page handout distributed to the Partnership Team in early May 2011 and develop a set of Frequently Asked Questions (FAQs). This fact sheet and set of FAQs will be the first in a series, introducing the project and giving background on the process. Throughout the AA, PBA will work with the Partnership Team to develop content for other fact sheets and FAQs to correspond with project milestones.

#### **Newsletters**

The Partnership Team may wish to include excerpts from the media kits or other prepared project materials in their newsletters or other communications, such as *Transportation Matters* or *ReMARC*, both produced by MARC. PBA will help in the coordination of these materials.

#### **Social Media**

Leveraging social media has become a must-do in public outreach, and can be both cost-effective and time-efficient. Content can be uploaded onto a variety of social media platforms (e.g., Facebook, Twitter, blogs) and video clips can go viral on sites such as YouTube. The Partnership Team will use, as appropriate, social networking sites to increase visibility of the project, capturing interest, and inspiring stakeholders who use them. MARC's KC Smart Moves has an existing Twitter feed that may be useful for distributing project updates and announcements. PBA will provide the Partnership Team with materials and information as necessary for social media networks, blogs, and message boards.

#### **Email Outreach**

Email blasts are also a cost-effective way to reach a large number of people quickly and with as much frequency as desired. The database of stakeholder addresses and property owners/residents within the study area can be expanded through events and organizations willing to share their membership. Email invitations to public meetings may be sent via email blast one to two weeks before each event.

## Reaching a Broader Audience

When advertising, scheduling meetings and distributing project materials, efforts will be made to involve a broader portion of the population, including disabled persons, racial and ethnic minorities, those of limited English proficiency, and low-income populations. Upon advance request, hearing-impaired and language interpreters may be provided for public meetings. Advertising should include contact information for those needing these or other special accommodations.

## **Document and Incorporate Public Input**

It is important to respond to comments and questions that have been submitted and explain how they are reviewed and considered. Draft responses will be prepared by the Partnership Team for consideration as appropriate. All comments will be documented and incorporated into an Appendix of this Public Participation Plan.



For more information on the Downtown Corridor AA, please visit the project's webpage at **www.kcsmartmoves.org** or contact the following:

## City of Kansas City, Missouri

**Sherri McIntyre**, Assistant City Manager for Infrastructure

**Email:** sherri.mcintyre@kcmo.org

**Telephone:** 816-513-1408

414 E. 12th Street Kansas City, MO 64106

## **Kansas City Area Transportation Authority**

**Richard Jarrold**, Chief Engineer

**Email:** djarrold@kcata.org **Telephone:** 816-346-0356

1200 E. 18th Street Kansas City, MO 64108

## **Mid-America Regional Council**

**Tom Gerend**, Assistant Director of Transportation

**Email:** tgerend@marc.org **Telephone:** 816-701-8303

600 Broadway, Suite 200 Kansas City, MO 64105



- 1. Meeting Schedule
- 2. Meeting Summaries and Results
- 3. Other Public Comments and Responses
- 4. Copies of Printed Materials
- 5. Media Relations

<sup>\*</sup>Appendix materials are unavailable to include at this time, but will be incorporated into the Final Public Participation Plan.

Open House #1 – June 21, 2011 Meeting Materials and Summary Results

## What's on Display

In addition to listening to today's short presentations, we encourage you to walk around the room and review the exhibits that are positioned along the walls. As you do so, you are welcome to provide your comments to the study team representatives who are positioned near each exhibit. Your input is important to the project, so please share your thoughts, ideas, and concerns with us. We want to hear what you think.

Name of Presentation Board	Information Described on the Board
Welcome	Information about tonight's meeting.
Process and Schedule	Description of the planning process and timeframe for the
	Downtown Corridor AA.
Purpose and Need	Key elements of the Draft Downtown Corridor AA Purpose and
	Need Statement.
Modes of Transit	Description of the differences between two modes of transit:
	the modern streetcar and a bus with a dedicated travel lane.
Alternatives	Maps of the initial set of alignments for the Downtown Corridor
	spanning from the River Market to Union Station on the north,
	through the Central Business District and Crossroads areas to
	Union Station and Crown Center on the south.
Next Steps	Involves the assessment of alternatives, determination of a locally
	preferred alternative and development of a corresponding
	financial plan.
How to Be Informed and Stay Involved	Describes how to access additional project information and
	whom to contact.

## Would you like more information?

Bookmark MARC's KC Smart Moves website, **www.kcsmartmoves.org**, and check back often to find project-related materials, announcements, and upcoming events!

You may also contact Triveece Harvey, AICP, at Patti Banks Associates to schedule a presentation for your stakeholder group. You can reach Triveece:

by email at **tharvey@pbassociates.com** or by phone at 816-756-5690 ext. 3038





www.kcsmartmoves.org



## What's Happening

The city of Kansas City, Mo., Kansas City Area Transportation Authority (KCATA), Jackson County, and Mid-America Regional Council (MARC) welcome you to the **June 21, 2011, open house** for the Downtown Corridor Alternatives Analysis (AA)! Today's meeting will run from **4–6:30 p.m.**, during which we will discuss a possible starter transit line for downtown Kansas City. The Downtown Corridor AA will identify the locally preferred alternative for a downtown fixed-guideway transit solution, and a viable plan to fund the construction, operation and maintenance of the line as a first step toward implementation. The narrow, two-mile corridor will run from the River Market on the north, through the Central Business District and the Crossroads areas to Union Station and Crown Center on the south.

## What You Can Do Today

At today's meeting you are encouraged to:

- **Listen to a short presentation** at 4:30 and/or 5:30 p.m. (Both are identical).
- Review exhibits that describe the overall planning process and schedule for the Downtown Corridor AA, the purpose and need for the AA, plus mode and alignment alternatives for the corridor.
- **Learn** about the differences between various types of transit, such as bus with a dedicated lane and streetcars.
- **Talk with staff** about what you see on display and hear during the presentation.
- Fill out a comment card before leaving that asks for your feedback on the Purpose and Need Statement for the Downtown Corridor AA and comments on the mode and alignment alternatives.

# Open House #1



Example of modern streetcar

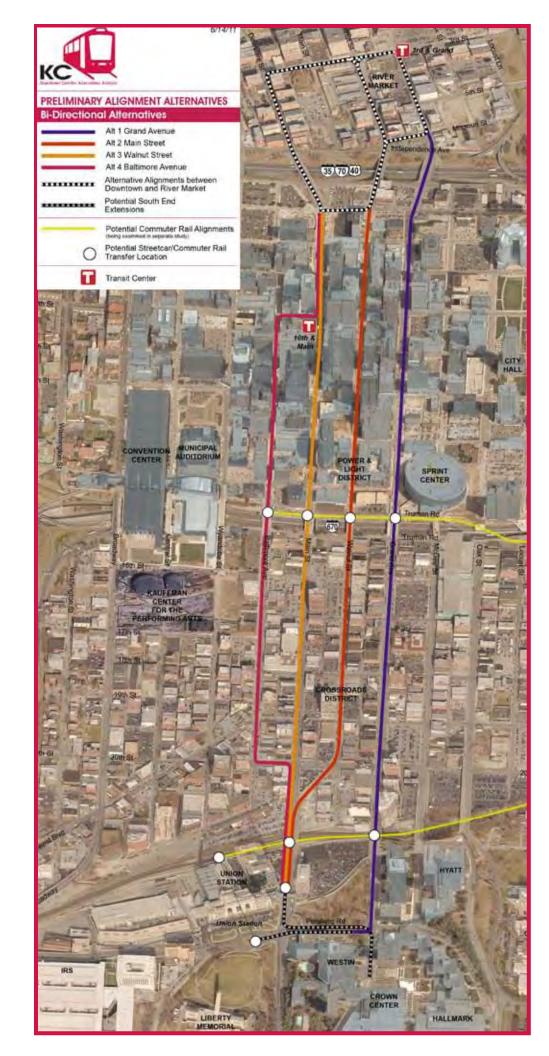


Meeting participants listen to a presentation



Meeting participants review exhibits

4



# Preliminary Alignment Alternatives

## The Purpose and Need for the Project

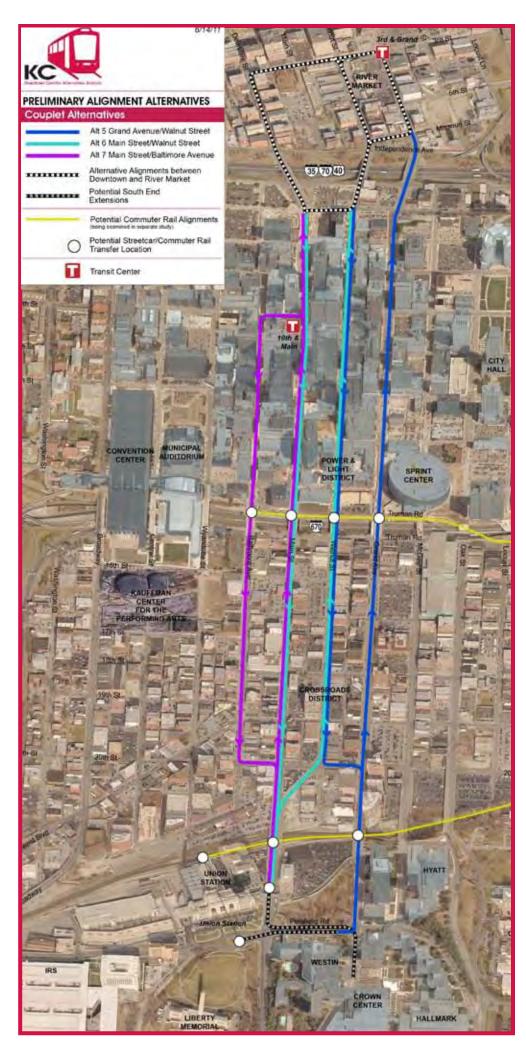
As described in the draft Purpose and Need Statement, the purpose of the Downtown Corridor AA is to provide an attractive transit option that will more conveniently connect people and places within the Downtown Corridor, and support regional and city efforts to develop downtown Kansas City and the Downtown Corridor as a more attractive and successful urban center. The project is needed to help the Downtown Corridor connect, develop, thrive, and sustain.

## **What's Next**

The Partnership Team and consultants will begin assessing the multiple alternatives on display today against a number of factors, including community concerns, potential ridership, right-of-way issues, economic development potential, operating and construction costs, plus traffic, land-use, environmental, and historic impacts. The assessment will result in a smaller number of alternatives that will be presented at the second open house in September. Ultimately, one LPA for a transit connection between River Market and Union Station/Crown Center will be selected with a corresponding plan to fund it. The LPA is Federal Transit Administration requirement and is necessary in order to obtain funding for the starter line.



The new starter line will connect downtown activity centers such as the River Market.





# **Purpose and Need Statement**

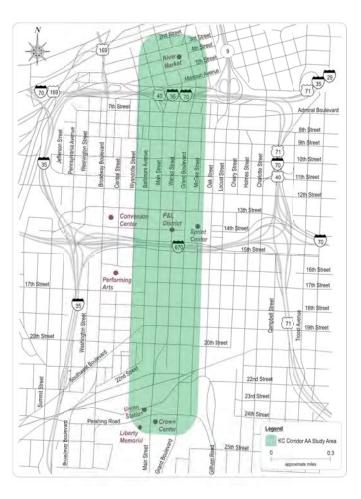
### 1. Introduction

This purpose and need statement provides an overview of the Downtown Corridor Alternatives Analysis Study, which is examining transit improvements between downtown Kansas City and the Crown Center Union Station area. This document provides a summary of key project information:

- Background on the study and a description of the corridor.
- An overview of the study's policy foundation.
- A description of purpose and need based on both transportation and nontransportation factors.
- Goals and Objectives.

This draft Purpose and Need Statement will be subject to further discussion and comment from the community, the general public and the regional partnership team that is guiding the project, and will become the basis for defining the study alternatives. It will be the basis for determining the evaluation criteria that will be used to evaluate the alternatives,

#### **Downtown Corridor**



and will lead to the selection of a Locally Preferred Alternative route and mode.



## 2. Project Background and Corridor

A partnership of the Kansas City Area Transportation Authority (KCATA), the Mid-America Regional Council (MARC), the City of Kansas City, Missouri, and Jackson County, Missouri is undertaking an Alternatives Analysis study that will examine enhanced transit solutions in Kansas City's Downtown Corridor. The study area for Kansas City's Downtown Corridor extends from the River Market area on the north, through the Central Business District and the Crossroads areas to Crown Center on the south.

This Alternatives Analysis will be consistent with FTA's Section 5309 New Start/Small Start funding program requirements and the study will evaluate and compare the costs, benefits, and impacts of a range of transit alignment and technology alternatives.

The study is planned to take approximately eight months and is expected to result in the recommendation and selection of a Locally Preferred Alternative (LPA). The process will include extensive input from the public, stakeholders (e.g., residents, business owners, etc.), and local, regional, state and federal agencies.

# Purpose and Need Purpose and Need Alternatives Definition Selection of Evaluation Measures Analysis of Alternatives: Costs, Benefits, Impacts Selection of Locally Preferred Alternative (LPA)

## 3. Policy Foundation

A strong multimodal transportation system will be critical for economic growth and the development of a sustainable future, and a large number of adopted regional and local policies support improved transit circulation in the Downtown Corridor. Key plan and policy initiatives include:



Greater Downtown Area Plan (City of Kansas City, MO), which presents a vision for the Greater Kansas City Downtown Area designed to improve quality of life in the region's core, protect precious natural capital, and strengthen economic vitality to competitively position Downtown as the region's cultural, economic, and activity center. The plan explicitly reinforces and embraces dense, mixed-use development in the Central Business Corridor – maintaining downtown as the densest area of the region, a regional office/employment center, the center of government, the most important cultural destination, the center



of entertainment/convention/tourism activity, and a significant retail destination. The plan recommends a transit corridor with rail down Main Street or Grand Boulevard. It also recommends some type of trolley circulator in the downtown area. The plan also calls for increased connectivity between neighborhoods and activity centers, focused on mixed-use activity centers to serve as nodes for the transit system. Transit-Oriented Development is encouraged.

<u>Smart Moves (MARC)</u>, which presents the Kansas City region's vision for expanded and enhanced regional transit service. These regional services will need to be supported by effective local transit



circulators services, especially in the Downtown corridor. The plan explicitly recognizes that transit service in key corridors needs to evolve to more intensive operational modes, such as bus rapid transit (BRT) and rail transit, as development intensifies over time.

**KCATA Comprehensive Service Analysis (KCATA)**, designed to develop short-term transit improvements to existing Metro services. Work to date has determined that service in downtown Kansas City is overly complex, and that the development of a Downtown – Crown Center "spine" would provide the foundation for simpler and more efficient service with downtown and in the Downtown corridor.

Transportation Outlook 2040 (MARC), which is the Kansas City Region's long-range transportation plan guiding how the Kansas City region will manage, operate



and invest \$18 billion in its multimodal transportation system over the next 30 years. It is designed to help the region grow more efficiently, maintain a competitive economy and





preserve the health of the environment, while enabling everyone to access opportunity. The plan lists "Place Making" as one of its nine system goals driving policy, with such objectives as walkability, density/mixed uses, transportation options, and infill/redevelopment.

Climate Protection Plan (City of Kansas City, MO), which lays out goals for the City of Kansas City to reduce its greenhouse gas emissions while simultaneously improving the economy and quality of life for the City's businesses and citizens. Several of the plan's recommendations are in harmony with the goals of the Downtown Corridor Alternatives Analysis, including the following: expand and further develop alternative transportation programs, develop a plan to implement light rail as part of a healthy overall public transit system, promote and incentivize development patterns that support alternative modes of transportation and avoid sprawl, reduce emissions by reducing net vehicle-miles traveled, enact a "complete streets" policy, and create a seamless regional transit system.

Rail-based transit has also been envisioned in transportation plans, land-use plans and previous studies for the Downtown Corridor. Downtown voters have consistently supported rail transit; for example, although the November 2008 light-rail ballot failed citywide with only 45 percent of voters in support, 64 percent of the voters of Ward 1 (most of the downtown area) voted in support. In addition, an Alternatives Analysis is being undertaken concurrently to evaluate potential commuter rail service between the eastern suburbs and downtown Kansas City. Such service would likely intersect with, and be complementary to, a downtown circulator.

## 4. Statement of Purpose

For much of the last 20-plus years, Kansas City's core, although it remained the most important economic engine of the region, has declined as more business and residents have moved to newly developing areas surrounding the core, or elsewhere in the region. A major emphasis of many regional efforts is to revitalize and grow the core, and improved transit within the Downtown corridor must be an essential part of these efforts. The purpose of the project is to provide an attractive transit option that will more conveniently connect people and places within the Downtown Corridor, and support regional and city efforts to develop downtown Kansas City and the Downtown Corridor as a more attractive and successful urban center.





## 5. Statement of Need

The need for this project is best encapsulated through four themes related to mobility and connectivity, economic development and growth, community and livability, and sustainability. This project is needed to help the Downtown Corridor **connect**, **develop**, **thrive**, and **sustain**.

#### 5.1. Connect

In downtown Kansas City, there is a need for enhanced linkages between activity centers to improve transportation options for local circulation. Transportation and transit issues include:

Improve Circulation within the Downtown Corridor. The Downtown Corridor includes a number of activity centers—River Market, Downtown, Crossroads, and Crown Center—that are geographically isolated. The existing transit system is configured to connect core areas with the larger region; the downtown portions of these radial routes do not function well as local circulators. In particular, the Main Street MAX BRT line serves the corridor, but is designed primarily to connect the Main Street corridor south of Crown Center with Crown Center and downtown, rather than provide circulation within the corridor. A major function of Downtown Corridor circulator service would be to serve trips within the corridor, including by visitors and attendees at special events such as First Fridays, Sprint Center events, and conventions.

<u>Connect Downtown Activity Centers.</u> Downtown Kansas City is the home of numerous regional activity centers. As the core of the region, it is the logical and established cultural and civic center. Recent developments (Sprint Center, Power and Light District, Performing Arts Center, etc.) have reinforced downtown's regional prominence and have initiated a resurgence in the study area's vitality. Ongoing, complementary transit investments that serve the particular mobility needs of this urban community are needed to sustain this resurgence.

<u>Enhance and Integrate Multimodal Transportation Options.</u> There is a need to further the goals of transit system integration, complement the existing bus and MAX systems, provide "last mile" connectivity for regional transit trips, provide distribution for future commuter rail, provide circulation for visitor and convention attendees, and, reduce the need for short auto trips in the downtown area.

- 5 -





<u>Improve Effectiveness and Efficiency of Existing Transit Services.</u> As described above, service in downtown is overly complex, and Downtown Corridor service could provide the spine for an overall restructuring of downtown and corridor services. An effective and easily-understood downtown circulator route could improve the usability of the larger transit system.

<u>Improve the Pedestrian Environment and Accessibility.</u> Increased walkability and pedestrian activity is a key goal in the downtown area. Even relatively short trips along this corridor are now often taken by automobile. Additional transportation options need be developed that would encourage more walking throughout the study area.

Access to Parks and Recreation Facilities. Park resources are generally concentrated at the ends of the Downtown Corridor. The Riverfront Heritage trail is currently difficult to access because it is somewhat isolated and disconnected from the more active parts of the downtown area. A new riverfront redevelopment plan is underway that seeks to expand activity in this area, and as new residential projects re-fill the downtown core, residents will need access to these parks.

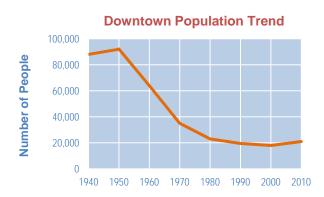
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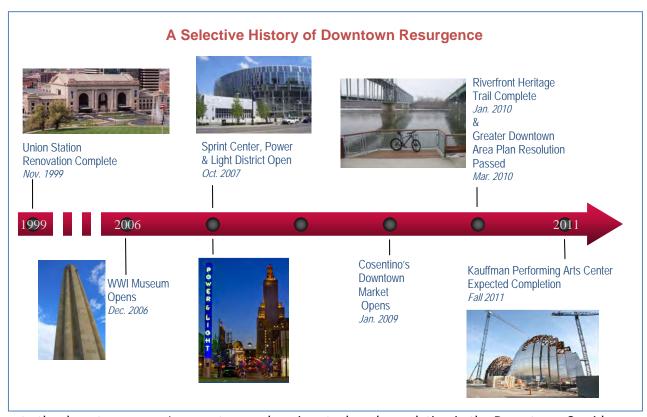


## 5.2. Develop

Employment and housing steadily declined in downtown Kansas City for decades, from a high of over 90,000 residents in the 1950s to under 20,000 in 2000. Still, the Downtown Corridor remains home to the greatest concentration of transportation, employment, medical, educational, visitor and cultural facilities in the Kansas City metro area, and the corridor's economic health and vitality are



important to the entire metro area. The past decade has seen major investments begin to transform (and restore) the downtown area into an attractive and vibrant destination (see graphic below). These significant investments need to be coupled with the return of residents and services



to the downtown area. In recent years, housing stock and population in the Downtown Corridor have increased (2010 population was 22,576), even while the City as a whole has experienced decreases.

- 7 -





However, the ability for these positive trends to continue is hampered by excessive dependence on automobile travel with resulting issues of parking supply and policies (described more fully below). Much of the redevelopment to date could be described as "urban, but automobile-dependent." Continuation of redevelopment with high automobile mode usage will be counterproductive to this intended intensity and character of development. In addition, recent significant incentives offered by the State of Kansas have caused some key businesses to move out of the downtown and across the state line, undermining some of the progress that has been made. Meanwhile, the region's policy initiatives are focused on supporting reinvestment, revitalization and a high-quality pedestrian environment in the study area. An integrated transit system in the urban core will improve mobility, economic development and community livability from both the local and regional perspectives, serving the people who live, work, and visit here, and reinforcing the positive trends now beginning to reverse previous declines.

Land use and economic goals in the corridor include:

<u>Encourage Development and Redevelopment</u>. The Greater Downtown Area Plan and other downtown planning initiatives encourage better utilization of underutilized parcels and surface parking lots, support re-filling empty storefronts and vacant office space, and encourage Transit-Oriented Development.

<u>Provide Catalyst for Redevelopment</u>. Public infrastructure investments are needed as a catalyst for development and redevelopment of vacant and underutilized parcels. Although transit investments such as the MAX BRT system have improved downtown transportation options, fixed-guideway transit has been shown to also serve as a catalyst for redevelopment, which traditional bus transit generally cannot accomplish due to the potential impermanence of bus routes.

<u>Increase Number of Downtown Residents</u>. The Greater Downtown Area Plan's goal is to double the downtown population, which will require building more housing as well as replacing housing that has been lost.

<u>Support Downtown's Historical Urban Fabric and Form.</u> Downtown Kansas City was built around a vibrant streetcar system. From the late 1890s to the mid 1940s, with peak annual ridership of 136 million in 1922, streetcars were the predominant mode of transportation, and literally shaped the downtown's urban form. Hence, much of the downtown area was laid out with streetcar-based transportation in mind, and is "under-parked" for access by automobile, and transportation options should support and respect this pattern of urbanism.





<u>Support Transit-Oriented Development/ Minimize the Need for Parking.</u> Parking policies in downtown Kansas City do not currently support the residential/employment density envisioned by future plans. Currently, new development must be accompanied by parking ratios that reflect an automobile-dominated transportation system. Transit planning in the downtown area needs to be better integrated with parking policy to result in more efficient use of land and recognition of walking and transit as primary transportation modes downtown. As the Study Area develops and redevelops, improved Downtown Corridor transit service can significantly reduce the need for additional parking and attendant automobile traffic and traffic congestion increases.

#### 5.3. Thrive

<u>Strengthen Downtown Districts and Urban Centers</u>. The Downtown Corridor comprises a "string" of distinct districts or centers. Each has a unique character; each is only partially realized since significant redevelopment opportunities remain in each as well:

- The Crown Center/Union Station area contains a mixture of major regional institutions and attractions, including Union Station, the World War I Museum, Penn Valley Park, the existing Crown Center and major additions to it now under development including the Seal Life Aquarium and Legoland Discovery Center, as well as a small amount of housing.
- The Crossroads District is a very urban, but lower-scale mixed use neighborhood, with a lively mixture of art galleries and arts-related businesses, housing, restaurants and small employers.
- The Sprint Center/Power & Light District is a major attractor, with large and small civic and cultural facilities and community gathering places, as well as restaurants, retail and entertainment businesses.
- The Downtown core is, as noted above, the historic center of office employment for the region for both the private and public sectors.
- The River Market district is both an urban residential neighborhood and the venue for the region's largest public market, with additional attractions and smaller businesses in the mix as well.

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<u>Support Existing Businesses.</u> The development of a stronger Downtown Corridor and provision of high-quality local transit circulation will increase business activity, which will increase business for existing enterprises, encourage existing businesses to stay, and attractive new business.

<u>Provide Additional Services for Residents.</u> At present, because there are now relatively few residents in the corridor, there are also relatively few services aimed at residents. The development of a stronger downtown corridor that attracts more residents will also attract new services for existing and added residents.

<u>Support Visitor and Tourism Activities.</u> Most of the Region's convention and tourism assets are in the Study Area. Kansas City's existing public transit system is designed around employment, and additional mobility options are needed to connect convention facilities, entertainment venues and hotels, which otherwise require short auto/taxi trips or specialized bus shuttle services.



Bartle Hall Convention Center

<u>Avoid Future Congestion.</u> Auto-based congestion will increase with the planned residential and employment growth, if it is developed with parking ratios typical for "urban, but automobile-dependent" development. However, auto-based capacity improvements involving new right-of-way are impractical due to physical constraints and would be counter-productive to the downtown goals.

<u>Serve Transit-Dependent Populations</u>. As housing increases in downtown, transit-dependent populations (including the elderly and those with disabilities) will locate close to accessible transportation if it is available. Provision of an accessible downtown transit system with level-boarding service would attract elderly and transit-dependent populations to the central area.

#### 5.4. Sustain

Downtown planning points to a need to create an environment that will promote long-term sustainable development, with development patterns that are less automobile-oriented and support environmental goals. Achieving a more transit-oriented pattern of development as redevelopment occurs will significantly reduce per capita vehicle miles traveled, the most significant contributor to greenhouse gas emissions.



## 6. Goals and Objectives

The goals identified below are consistent with the Kansas City Region's vision for the future, and address the Purpose and Need for the Project as summarized in Sections 4 and 5 above. Associated with each goal is a related list of objectives. Objectives provide guidance for attaining each goal, represent successive levels of achievement in movement toward the goal, and reflect the expected results achieved by a stated point in time (the planning horizon for the project). These goals and objectives will form the basis for the Evaluation Criteria that will be defined and used to compare study alternatives.

#### **Goal 1: Connect**

#### Objectives:

- Provide more focused and easily-accessed transit options within and between downtown and Crown Center.
- Connect key activity centers and population centers.
- Develop a transit spine around which existing transit services can be more effectively organized.
- Expand transit choices and improve local circulation to attract new riders.
- Serve as an initial "building block" in the region's desired rail transit system.
- Enhance mobility throughout the corridor; integrate with other elements of the existing transportation system (e.g., automobile, pedestrian, bicycle).
- Facilitate car-free travel by residents, employees, and visitors, including convention attendees.
- Provide effective connections to planned/future commuter rail service.
- Support future system expansion to other neighborhoods.
- Develop an initial system with a capital cost and annual operating cost that are financially sustainable.
- Encourage support (conceptual, political, and financial) for transportation solutions from property owners near the route, including institutions, businesses, and developers.
- Facilitate the development of complete streets and a better pedestrian environment.
- Recognize the expressed intent of voters in the downtown area to build a rail system that serves the Downtown Corridor.

## **Goal 2: Develop**





#### **Objectives:**

- Support existing employment centers in Downtown, Crossroads, and the Crown Center/Union Station area.
- Support existing residential development centers in the River Market, Crossroads and the Crown Center/Union Station area.
- Spur new development throughout the corridor.
- Encourage higher-density, mixed-use land use patterns consistent with local and regional plans and to better support transit.
- Convert surface parking to transit-oriented mixed-use development.
- Reduce the amount of parking that will be associated with new development.
- Prevent future congestion due to new development.
- Refill empty office buildings.

#### Goal 3: Thrive

#### **Objectives:**

- Enhance quality of life and access to corridor destinations for residents, employees and visitors to the downtown area.
- Support the strength and character of existing neighborhoods; provide access to cultural facilities, retail, parks, and entertainment venues.
- Enhance access to, and the vitality of existing activity centers.
- Support convention, cultural, and special event activities.
- Support the development of new activity centers in the corridor.
- Increase the safety and security of the transportation system for transit users, vehicles, bicyclists and pedestrians.

#### Goal 4: Sustain

#### Objectives:

- Preserve the historic character of the downtown area by supporting the re-use of vacant and under-utilized historic buildings and promote appropriately scaled infill development.
- Provide more environmentally-friendly transportation options.
- Reduce the amount of space devoted to parking.
- Reinforce a pattern of development that creates less greenhouse gas emissions through higher residential densities and lower per capita vehicle miles traveled.





# Welcome

- Thank you for joining us at tonight's **Downtown** Corridor Alternatives
   Analysis (AA) public meeting!
  - Open House: 4-6:30 p.m.
  - Short Presentations:4:30 and 5:30 p.m.
- What You Can Do
  - Review the meeting displays
  - Listen to a presentation
  - Ask questions and tell us what you think

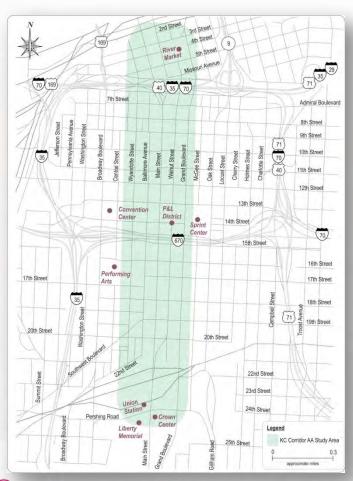


Please fill out a comment card before you leave.





# **Overview**



## **Downtown Corridor AA**

- Focused look at transit options in a corridor running from River Market to Union Station / Crown Center
- Result will be a single Locally Preferred Alternative, supporting downtown goals, investment, and the regional transit vision
- Funded by the Federal Transit Administration





# **Process & Schedule**

## Stakeholder Outreach

## Ongoing Meetings

- Neighborhoods
- Civic leaders
- Transportation groups
- Elected officials
- Downtown Parking and Transportation Commission
- Business/Economic development community
- Media

## Public Open Houses

Held at key milestones

## **Time-frame**

we are here

## April – June 2011

- Purpose and Need Statement
- Project goals and objectives
- Identification of alternatives

## July – September 2011

- Detailed alternatives assessment (resulting in the Locally Preferred Alternative)
- Financial assessment

## October – December 2011

- Draft report
- January 2012
  - Final report to Federal Transit
     Administration





# **Project Purpose**

The purpose of the project is to provide an attractive transit option that will more conveniently connect people and places within the Downtown Corridor, and support regional and city efforts to develop downtown Kansas City and the Downtown Corridor as a more vibrant and successful urban center.



# **Project Need:**

## Connect, Develop, Thrive & Sustain

## **Connect**

- Improve circulation within downtown
- Connect downtown activity centers
- Enhance and integrate multimodal transportation options
- Improve effectiveness and efficiency of existing transit services
- Improve pedestrian environment and accessibility
- Provide access to parks and recreational facilities

# Develop

- Encourage development and redevelopment
- Provide a catalyst for redevelopment
- Increase number of downtown residents
- Support downtown's historical urban fabric and form
- Support transit-oriented development/ minimize the need for parking



# **Project Need:**

# Connect, Develop, Thrive & Sustain

## **Thrive**

- Strengthen downtown districts and support existing businesses
- Provide additional services for residents
- Support visitor and tourism activities
- Avoid future congestion
- Serve transit-dependent populations

# Sustain

- Promote long-term sustainable development
- Reduce vehicle-miles traveled
- Improve air quality
- Improve public health
- Promote walkability





# **Modes of Transit**

## **Circulator Bus**



- Generally diesel-powered
- Generally on-street, but can have separated, fixed guideway
- Can carry up to 75 passengers

## **Modern Streetcar**



- Generally electrically powered
- Fixed guideway (rail); shares traffic lane with autos
- Can carry up to 120 passengers





# **How to Pay for It?**

## Guiding Principles

- No dedicated city-wide sales or property tax
- Fixed rail creates "permanence" that spurs investment
- No diversion of KCATA funding

## Potential Sources of Funding

- Rider fares
- District sales tax and/or special assessments (only within corridor)
- Federal grants
- Advertising and naming rights
- Other sources consistent with guiding principles







# **Next Steps**

## July - September 2011

- Evaluation of the multiple options by applying several factors including:
  - Stakeholder input
  - Potential ridership
  - Traffic impacts
  - Right-of-way issues
  - Land use impacts
  - Community issues
  - Economic development potential

- Environmental and historic resource impacts
- Operating and construction costs
- Development of Locally Preferred Alternative (LPA)
- Financial assessment
- Second public open house





# **Stay Informed**

- Keep up with the latest on the Downtown Corridor AA by:
  - Bookmarking our web siteat: <a href="https://www.kcsmartmoves.org">www.kcsmartmoves.org</a>
  - Scheduling a presentation for your group via:
    - Triveece Harvey,
       Patti Banks Associates at:
       <u>tharvey@pbassociates.com</u>
       and 816-756-5690 x. 3038







# Study Purpose and Goals

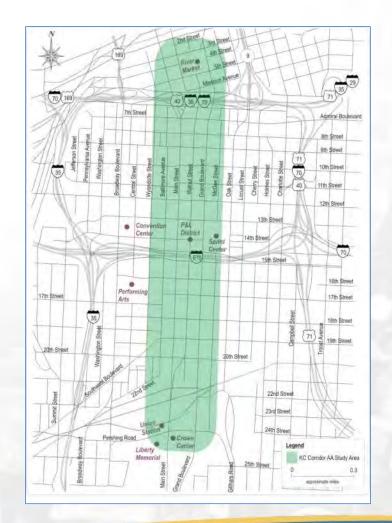
- Complete Federally required Alternative Analysis (AA)
- Identify one Locally Preferred Alternative (LPA) for a transit connection between River Market and Union Station/Crown Center
- Develop a viable financial plan to fund construction, operation, and maintenance.
- Coordinate with the Jackson County Commuter Corridors AA, potential and existing regional transit services.



# Downtown Corridor AA Study Area

 Narrow, two-mile corridor in downtown Kansas City, Mo.

 Runs from the River Market on the north, through the Central Business District and the Crossroads areas to Union Station and Crown Center on the south.





# Coordination and Background

 Building on the efforts of previous transit studies





## Partners and Consultants

# Partnership Team:

- Kansas City, Mo.
- Kansas City Area Transportation Authority
- Mid-America Regional Council
- Jackson County, Mo.



## Consultants:

 HDR Inc. with assistance from Nelson/Nygaard, Polsinelli Shughart; Patti Banks Associates, HG Consult, Inc; Burns & McDonnell; and Architectural and Historical Research



# **Timeframe**

# April – June 2011

- Purpose and Need
- Project Goals and Objectives
- Identification of Alternatives

# July – September 2011

- Detailed Alternatives Assessment (resulting in the locally preferred alternative)
- Financial Assessment

## October – December 2011

- Draft Report
- January 2012
  - Final Report to Federal Transit Administration

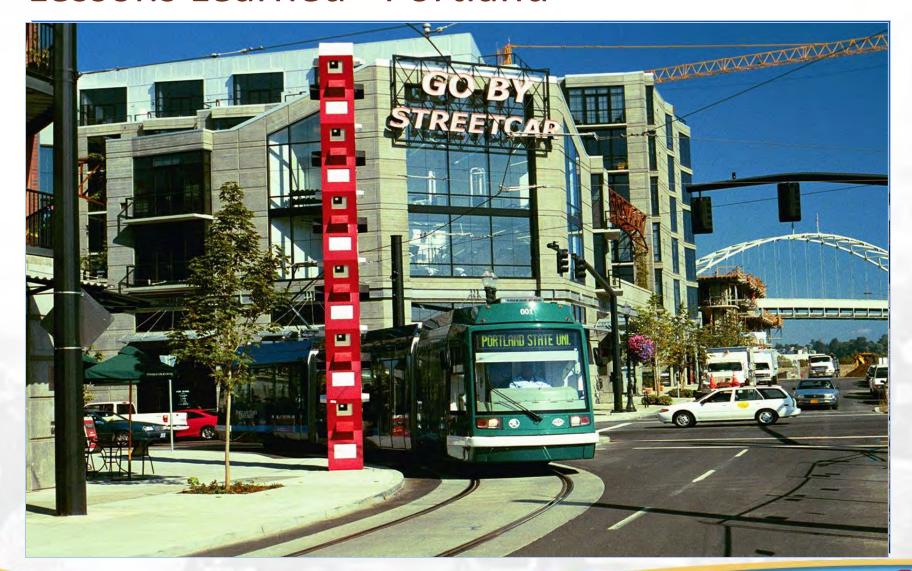


# **Project Purpose:**

"The purpose of the project is to provide an attractive transit option that will more conveniently connect people and places within the Downtown Corridor, and support regional and city efforts to develop downtown Kansas City and the Downtown Corridor as a more attractive and successful urban center."



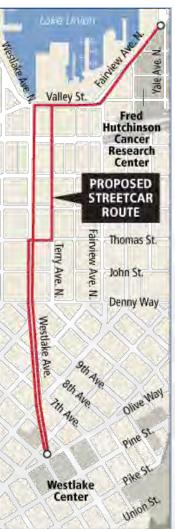
# Lessons Learned - Portland





## Lessons Learned - Seattle



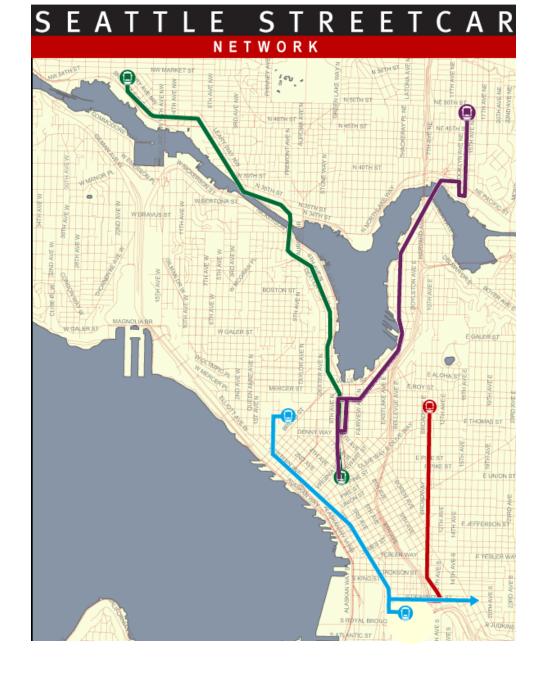




# Lessons Learned - Seattle







Develop and Compare
Alternatives...both modes of transit <u>and</u> the possible routes







# **Mode Alternatives**



















# Potential Tier 1 alignments:





# Next Steps in this Process

 Development of Evaluation Criteria for Tier 1 screening of the alternative alignments

Best-performing short list becomes the Tier 2 alignments

- Tier 2 Review:
  - Cost
  - Ridership
  - Economic Development potential
  - Financing potential





Engineering and Technical Aspects





• Utilities, Low Clearances, and Structures





Handling Special Events





Maintenance and Storage Facilities





**Portland** 

**Seattle** 



# Integrating transit with public spaces



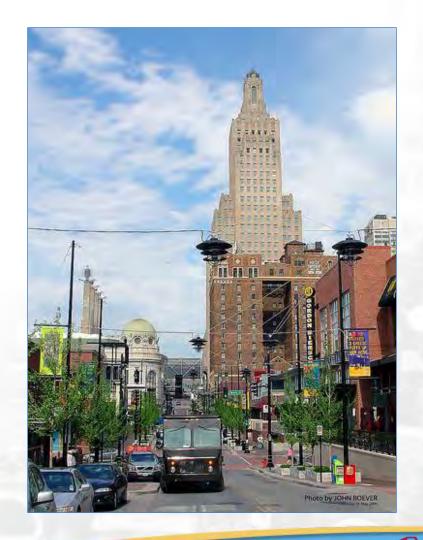








- The final locally preferred alternative will respond to:
  - Potential ridership
  - Traffic impacts
  - Right-of-way issues
  - Land use impacts
  - Community issues
  - Economic development potential
  - Environmental and impacts on historic resources
  - Operating and construction costs
  - Project financing potential

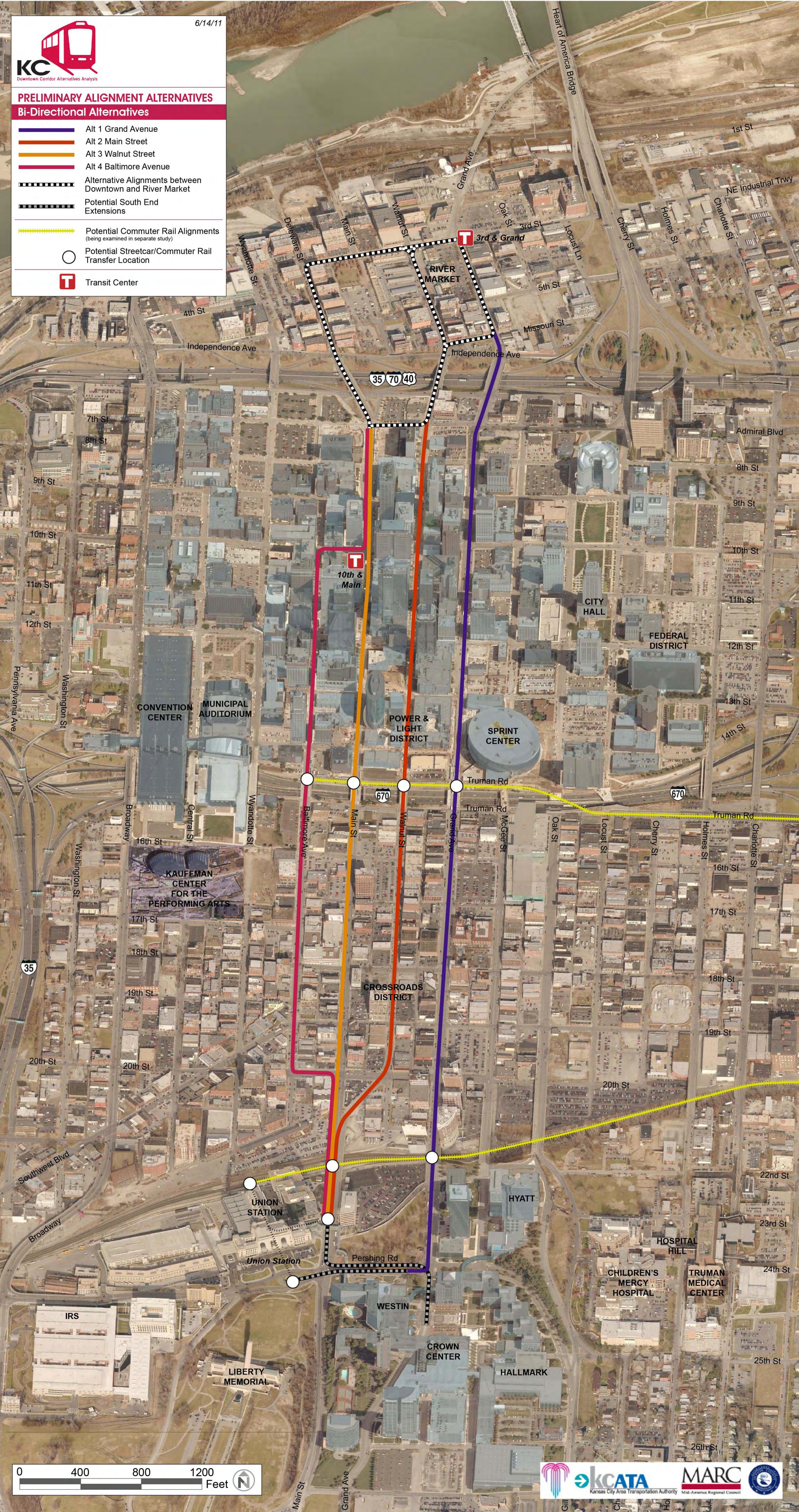


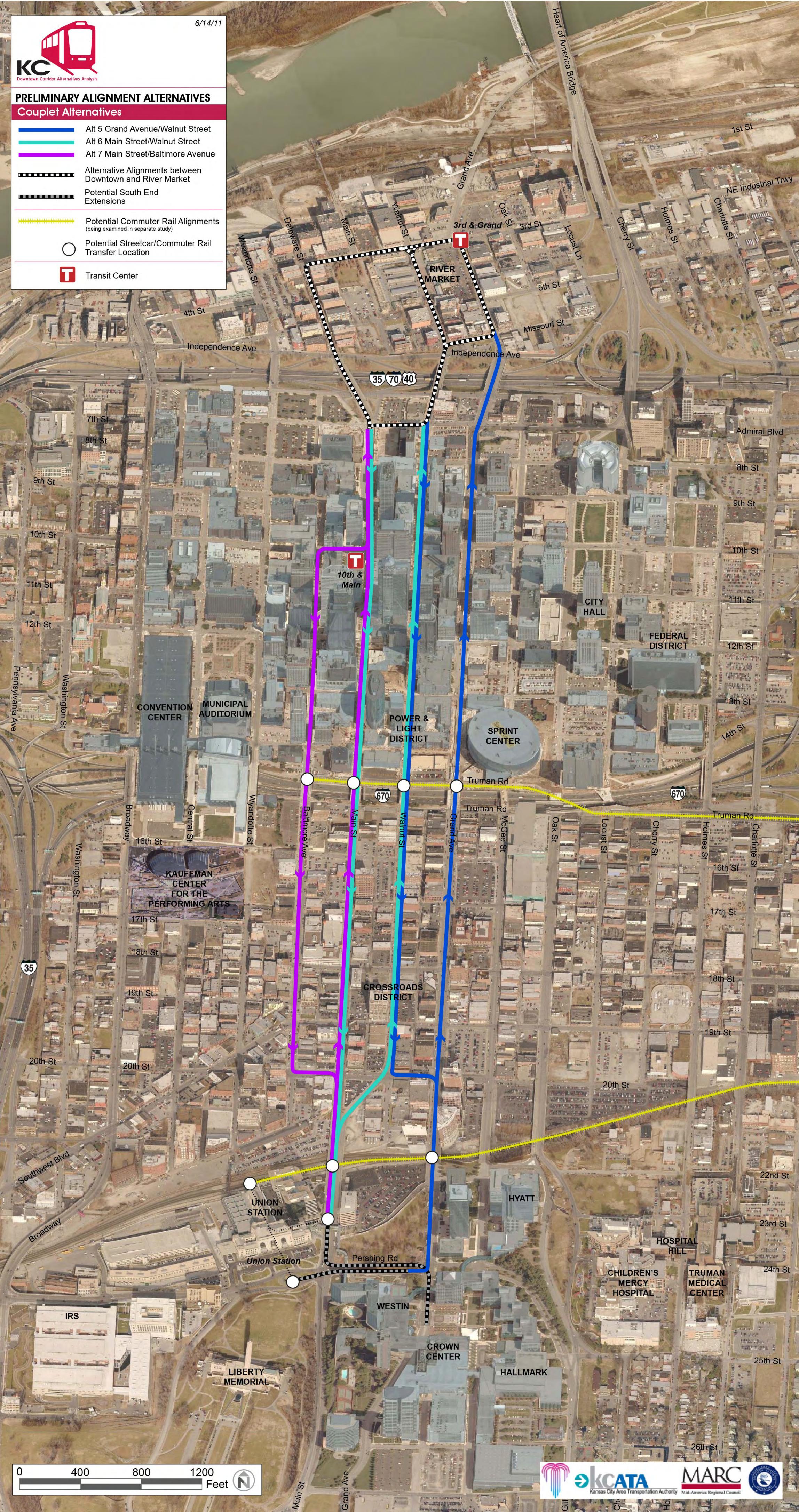


## **Questions or Comments?**

- Visit <u>www.kcsmartmoves.org</u>
- Email or Call a Partnership Team Member
  - Sherri McIntyre, City of Kansas City at:
     <a href="mailto:sherri.mcintyre@kcmo.org">sherri.mcintyre@kcmo.org</a> and 816-513-1408
  - Tom Gerend, Mid-America Regional Council at: <u>tgerend@marc.org</u> and 816-701-8303
  - Dick Jarrold, Kansas City Area Transportation Authority at: djarrold@kcata.org and 816-346-0356
- Schedule a Presentation
  - Triveece Harvey, Patti Banks Associates at:
     <a href="mailto:tharvey@pbassociates.com">tharvey@pbassociates.com</a> and 816-756-5690 x. 3038









## **Public Open House**

Tuesday, June 21, 2011 from 4 to 6:30 PM CST Central Branch – Kansas City Public Library 14 W. 10<sup>th</sup> Street, Kansas City, Mo. 64105

A public open house was held to discuss the Downtown Corridor Alternatives Analysis (AA) on June 21, 2011 from 4 to 6:30 p.m. in Helzberg Auditorium at the Central Branch of the Kansas City Public Library (14 W. 10<sup>th</sup> Street) in Kansas City, Mo. Short, identical presentations were given at 4:30 and 5:30 p.m. The purpose of the meeting was to provide targeted stakeholder groups and the general public and media with an overview of the Downtown Corridor AA as well as to:

- Share information about the:
  - o Purpose and need for the AA.
  - o How the AA differs from previous efforts.
  - o Planning process and schedule for the AA.
  - Differences between transit modes, such as the modern street car and circulator bus.
  - o Alignment alternatives for a potential, fixed-guideway starter line.
  - Eventual development of a Locally Preferred Alternative (LPA) and general financing strategies for it.
- Gather feedback on:
  - o Purpose and need for the AA.
  - o Preferred transit modes and starter line alignments.

A total of 113 people attended the open house in addition to the project team. Attendees included local public officials and staff, downtown residents, business representatives, neighborhood groups, umbrella agencies, advocacy groups, and television, print, and radio news media. Notice was provided via press release, <a href="https://www.smartmoves.org">www.smartmoves.org</a>, email blast, bus bulletin, Facebook, and stakeholder meeting announcements. An overview of the information presented at the meeting, general comments, comment card responses, and other comments are included below.

## **Handouts and Exhibits**

Handouts provided to meeting participants included:

- Meeting overview handout
- Project fact sheet





- Project comment form
- Meeting evaluation form

Meeting participants were encouraged to review the following exhibits:

- Welcome: Relevant meeting information
- Overview: Project description
- Process and Schedule: General project details
- Project Purpose and Need: Purpose and need statement
- Modes of Transit: Circulator bus and modern streetcar comparison
- How to Pay for If: Guiding principles and potential sources of funding
- Next Steps: Planning process activities for July September 2011
- Stay Informed: <u>www.smartmoves.org</u>

## **General Summary of Comments**

Fifty (50) hardcopy and 14 electronic comment cards were returned to the project team plus other comments received in a variety of ways, e.g. by email, phone, or letter, during the weeks that followed the open house. Generally, the feedback received related to:

## Improve transit downtown:

- o For visitors, residents, and workers alike
- Due to issues with the current bus system (general and MAX), e.g. timing/scheduling, confusing routes
- Better connect destinations
- o Improve convenience
- Decrease dependence on the automobile
- Improve the urban core and spur development
- o Help Kansas City compete with other cities

#### • Agreement on the purpose and need statement, noting that the starter line could:

- Trigger economic development and encourage infill
- Support continual growth downtown
- Represent permanent downtown investment
- Create better transit connections and circulation, particularly for short trips
- Be the beginning of fixed-guideway transit in Kansas City
- Support tourism





#### Interest in the modern streetcar because it would:

- Use permanent rails
- Be a predictable, fixed route circulator
- Have a positive connotation/perception
- Offer an easy riding experience
- Demonstrate permanence of investment

## • Interest in all of the alignment alternatives

 Most comments focused on Main Street and the Main Street/Walnut couplet and other provided alternatives but one respondent suggested that Wyandotte Street be studied among the alignment alternatives.

#### Other comments

- Excited about the project.
- Connections into or through the City Market Additional detail and presentation requested.
- Potential for expansion and connection with other transit routes
- o Integration and accommodation of bicycles with the starter line
- Expanded bus service as a better mode choice than streetcar
- Consideration and accommodations for the Performing Arts and Sprint Centers events and/or activities.
- Request for additional streetcar details, .e.g. operations, hours of service, funding mechanisms, potential rider fares/ticketing, potential ridership, timing for construction, etc.

## **Verbatim Comments from Comment Cards**

The comment forms provided to meeting participants during the meeting and via the project webpage included the four questions below and resulted in the answers included with each.

## Do you think there is a need for improved transit downtown? Why?

- Yes. Many times we (my office) want to go other places during the day for lunch, the walk from 10<sup>th</sup> and Main to Crossroads is just too long for a quick lunch. I used to live downtown and I would have much rather not used my car to drive and run errands.
- Yes. For people living downtown MAX was a nice try to get around the city but is late, makes irregular stops and is generally another bus route. For visitor

   a simple system to drop them at all stops and city offices.





- Overall, yes. The MAX does a good job, but there area too many stops along the route. I think, a free, streetcar(s) would be more popular and would help KC be seen as a progressive city.
- Absolutely. Our public transportation is nearly non-existent. To recruit creative people to our city, to decrease our sprawl and wasted infrastructure dollars on it, and to bring us into the modern world, a real public transportation system is a must.
- I feel improved downtown transit frequency and appeal would benefit tourism, marketability, and access to downtown "attractions" for both suburbanites and visitors to the city. Urban dwellers would also benefit.
- Primarily as a means to increase connectivity from the River Market to Crown Center. Also as a tool for economic development.
- Yes, would encourage people movement, ease of access, fewer cars trying to park, people more apt to venture further for lunch/dinner/outings.
- Yes. It is hard to figure out the existing system. I can't figure out the MAX system. What it is, where it goes, how much it costs. It looks like something I might find useful. I just can't figure out how it works.
- o Come on R u kidding? Of course!
- Yes. Visitors to our city never get to see our beautiful city. They are just kind of lost downtown. I have talked with many of them over the years. We need the starter so people can get around downtown and hopefully want to expand it to other areas.
- Yes. Current bus routes don't appear to be well utilized for short trips to and from different parts of downtown.
- o Yes. Need less reliance on single passenger auto.
- Yes Downtown is thriving but to maintain residential and employment growth, transit is required. Transit is essential to achieving our goals.
- o Yes. It is too difficult to use the present system.
- Yes But I do think the MAX service is a good start.
- Absolutely Downtown is the perfect area to start developing a system to make KC less car-dependent.
- o I rarely use transit because it isn't convenient. I think transit will help increase residents (downtown) and help us become a major city and not just a region of suburbs.
- o 1) Connecting KC's various downtowns is important. 2) will promote living in urban core and sustain office/retail area.





- Yes indeed. The better folks can move around, the better the flow of commerce and \_\_\_\_\_\_ business that takes place in KC.
- Yes Because the current system is atrocious.
- Yes, we need to keep up with our urban centers around the country. If we don't increase options, all we will have is a landscape of parking garages and lots.
- Yes Short trips and tourists.
- Yes. I think it is time for KC to join other cities in providing an eco-friendly, mass transit option.
- o Yes.
- Yes, become less auto dependent.
- Yes. Because right now downtown KC is still car-centric. Having a streetcar would help eliminate some two car dependence in downtown.
- Yes. Improved/alternate transportation will allow increased public opportunities to shop, dine, and live in the downtown area without working about parking/traffic.
- o Keep from waiting on regular buses most up to an hour.
- Yes. I think improved transit to serve a growing residential population and visitors would be an asset to continuing the growth and development of downtown.
- Yes! In the last year gas prices seem to have pushed use up and the MAX/KCATA/Jo Bus are crowded, confusing, and not useful for day to day trips (groceries, household shopping).
- Yes. Cars take up much space, \_\_\_ physically and psychologically in our urban life.
- Yes It would help people get from place to place with greater comfort.
- Yes, easy access to areas that fell too close together to drive to but feel like a long walk.
- Yes!! Autos dominate here...boo. Get us some bike, ped, multi-modal transit.
- Yes, there is a need for a spine-like service for the Metro.
- Yes. Kansas City used to have great streetcar live and downtown has suffered ever since they too that car out. KC is behind other major cities when it comes to mass transit.
- Yes, to connect and improve the urban core.





- No! Frankly, I am shocked and disappointed at the idea, when the greatest need for transportation is in the Northland (North Counties). Plenty of buses serve the downtown area as well.
- Timeliness Bus always off schedule. Concise route.
- Yes So long as there are economic development improvements that support additional ridership.
- Yes, because we have to start somewhere to replace the auto as the primary transportation vehicle.
- Residents and visitors need to be persuaded that driving around looking for parking places, especially when events occur that increase density, however temporary, leads to frustration and energy waste. A convenient, frequent alternative mode would do that.
- o Yes. Simplifications of existing KCATA bus routes citywide.
- Yes. Rail has proven to add density over time which is essential to KC's long term success. Also, better transit is essential for many low income residents who rely on it for access to jobs.
- Improve transit in the whole region! We are behind other cities offering transit.
   This is a better investment than more roads and parking. Senior and low income population needs it. Others want it.
- Yes Get rid of cars. Horrible to pedestrians.
- Yes, downtown has seen significant redevelopment in the last 5-10 years and the number of people traveling within the corridor seems sufficient to support a system. Reduces congestion, reduces emissions.
- o Yes.
- Yes All easily identifiable modes of public transportation for those of us who come downtown occasionally.
- Yes. We need to change the prevailing automobile-centric mindset and I think it'll take rail transit to do it.
- Yes. If Kansas City wishes to improve its urban core, then it needs a dedicated transit corridor. This means a dedicated right-of-way for either a streetcar or true BRT.
- Yes. Consistent, on-time, high-profile, high frequency, weekend and night time transportation is needed.
- Yes, with proper planning, downtown transit could be much faster than it is today.
- Absolutely. I work downtown and would love to see an improved transit system. I'm even more excited about the long-term possibility of a transit





system which helps me commute to work more quickly and efficiently, but I understand that this is an important first step. My primary fear is that all of this discussion and effort will result in a recommendation to simply improve the bus system. In my opinion, that would be a very disappointing and short-sighted proposal, even considering the obvious financial ease of such a recommendation. The reputation of the bus system is already low and its complete reliance on the existing traffic network will never allow it to be highly-utilized no matter the improvements. A rail system absolutely must be developed eventually for KC to be competitive, so we might as well start on it sooner rather than later.

- Absolutely. Our downtown is quite spread out considering the number of people. Bus routes weave about and are confusing to people who do not ride often. Evening stops are infrequent and make it difficult to count on the bus with waits up to one hour (ie, 51 on weekends).
- Yes. Downtown needs to be able to more effectively compete with Johnson County for businesses and jobs. One way to make downtown more attractive is increased transit access. That said, almost all of Kansas City's urban core is starved for good transit. Downtown is not unique in this need.
- Absolutely. Kansas City, being one of the worst metro areas in the nation in regards to transit, needs to start somewhere. Downtown KC is a logical place to start.
- yes. a transit system that is utilized by a significant % of the population decreases pollution, parking issues, and gives more people an option not to have to depend on personal automobile transit.
- Absolutely. Street cars will expand transportation options and put a focus on downtown KC as the center of this region. With this long-term public investment in transportation, it will attract private development and build the case for the return of the streetcars in KC.
- Yes. What really needs to happen is a reduction in parking while increasing transit service. Limiting the number of spaces, and taxing them, would increase the incentive to use transit.
- The busses seem to run pretty regularly and traffic isn't much of a problem. I'd like to see some more bike lanes, but I don't know what, if any problems exist now.
- Yes! The bus routes are spread out all over and none of few of them are designed for getting around within the greater downtown area.
- Absolutely. 1. The easier it is to get around, the more likely people will feel comfortable coming/being downtown (locals and visitors). 2. Existing business/residential will grow which will attract new business/residential. 3. The perception is that KC is trailing other cities.





- Yes. Tourists, gas costs, urban/pedestrian experience, lessening the need for garage construction, increasing pollution, aging baby boomers...
- Yes. Our city has a dire need for an extensive public transportation system. This will serve as a great starting block for further public transportation in the Kansas City metro.
- Yes. Buses run routes that change streets on a whim. Very few direct routes. The number 51 route is a prime example.
- Yes, lack of clear, consistent, modern transport option to travel in this corridor creates a STILL consistent need for travel in ones own vehicle leading to too many parking garages, surface parking lots, and limited parking spaces at various destinations in this corridor. You have to start somewhere/sometime and this is the best 'starting option' we have discussed. Utilizing Union Station is key IMO.
- Yes! It would be great for visitors and downtown workers to get some of the car traffic off the road
- Yes, downtown growth requires transportation from the edges to the core city.
   Innovative transit systems produce growth business such as street cafes and boutiques. Denver is the best example.
- Yes. I don't go downtown too often, but when I do it's always an adventure finding somewhere to park. I usually end up at the Park and Ride at River Market and just take the MAX to the locations I need.
- There is definitely a need for improved transit downtown. In these times of ever rising fuel costs, an attractive alternative to driving is a necessity.
   Since the density of jobs, retail and activity centers downtown permit walking to your destination once you arrive on transit, downtown is the ideal place to start.
- Yes I believe there is a need. I am a downtown resident and I rely on public transportation. I feel that downtown needs more night and weekend transportation, especially if it wants to attract large numbers of people in to downtown's entertainment districts. Also, offering a safe alternative to drinking and driving.
- o I do think there is a need for improved transit downtown and in the suburbs.
- Yes. I don't think traffic is terrible downtown, but it would make it more accessible, and people more productive if you could read a book or work on the way instead of driving. You would think it would make nightlife safer and more profitable considering people could hang out for happy hour after work and take a train home instead of driving or just skipping out on patronizing downtown businesses.
  - I think there's something psychological about a STREETCAR vs. a bus, that makes it seem more reliable (you can see the tracks) and makes people more likely to take it.
- Yes. If Kansas City wishes to improve its urban core, then it needs a dedicated transit corridor. This means a dedicated right-of-way for either a streetcar or true BRT.





- Yes. Consistent, on-time, high-profile, high frequency, weekend and nighttime transportation is needed.
- According to the Purpose and Need Statement for the Downtown Corridor Alternatives Analysis, "The purpose of the project is to provide an attractive transit option that will more conveniently connect people and places within the downtown corridor, and support regional and city efforts to develop Kansas City and the downtown corridor as a more attractive and successful urban center...The project is needed to help the downtown corridor connect, develop, thrive, and sustain". Do you agree with the purpose and need statement? Why or why not?
  - Yes. Various parts of downtown are thriving and having something like the car transit connect everything, everyone and allow for future expansion, would help accomplish all of these things; develop thrive and sustain. We need this to keep up with other downtowns.
  - Yes Emphasis on downtown corridor. Appreciate the starter line approach.
     Walk before running.
  - Yes. Kansas City will never be a town with huge mass transit ridership. Instead
    a streetcar system will promote development in downtown and help
    downtown workers, residents, and visitors more easily move between areas.
  - Yes. I would substitute [as follows] "...The project is needed to help the downtown corridor continues to connect, develop, thrive, and sustain the downtown corridor."
  - Yes. A big gripe of suburbanites about visiting downtown venues is parking availability close to their events. This kind of transit would make events accessible from numerous parking opportunities all along the line. This would boost downtown business and growth.
  - Yes. As a downtown residents I would like to see continued growth in both population and density of service. I believe urban transit will also appeal to conventions and out of town tourists.
  - o Yes.
  - Yes. Most importantly, it needs to connect with the suburbs. If you can make it easy to get downtown from the suburbs, companies will want to locate downtown. That is what will make downtown develop and thrive. Then the corridor transportation will make it easy to move around once people get downtown.
  - Yes Get people out of their cars and put feet on the street Even for only 2 or 3 blocks.
  - o I do agree. There are lots of people living downtown again (once there were neighborhoods). Those have been destroyed and housing with it and now





lofts and condos and apartments are bringing people back to live, many near their work. Then with visitors, convention people, and a need for good transportation that is bike and pedestrian friendly and gets away from the cars everywhere.

- Yes. Downtown is too big, particularly from north to south, for people to walk to and from different areas.
- Yes. Other cities that have adopted this approach have seen their downtowns thrive.
- Yes, the statement should be even bolder in its vision. Downtown must become the <u>most attractive</u> and successful urban center.
- o Yes. Because it is important.
- o Sounds good to me.
- o I would like to see the development this would generate (yes).
- o I agree, the city can be an exciting place and if it is accessible people want to come. People enjoy the cities that have transit and talk about how great they area. If we don't have a strong core our strong suburbs may deteriorate.
- Yes. Strong urban core is critical for maintaining and growing a strong city.
   Fixed streetcar transit will connect various core areas of KCMO's downtown into one core working together instead of cross purpose.
- o Yes.
- Yes Must be attractive, convenient, affordable, and provide connectivity throughout downtown.
- Doesn't talk about current lack of options for travelers who desire transit service. Yes, there are existing bus routes but too many stops and not friendly for the casual 1 trip per week ride.
- Yes To encourage developing with the corridor.
- Yes. Downtown KC is not convenient for getting around. Parking is difficult. If you want to go to more than one locations, it is difficult to do without moving your car and dealing with the same problems at each location.
- o Yes.
- o Yes.
- Yes. See above.
- o Yes.
- o Yes.





- Yes because the character of the neighborhoods is already there but connectivity is needed to draw bigger development. Improved transit expands development options and helps keep up the momentum in urban living, while also connecting tourists to other hubs.
- o Yes. It represents a commitment and instills confidence.
- Yes I feel this is accurate and well thought out.
- Yes. Connection is key with development needed between the nodes. In between development will only sustain with the something that constant brings people to/past it.
- Yes. All good things.
- o Yes.
- o Yes. Those are the fair things all cities need to stay important and "influential".
- Yes, I am in agreement with items circles [connect, develop, thrive, and sustain].
- o No, I disagree for the reasons stated above. Therefore, what you are proposing sounds like a waste of money.
- o Yes.
- Yes These types of projects are only successful when they area community
  asset
- o I like the statement but it seems too wordy.
- Agree. Removal, elimination or diminishing private auto use will help enormously to remove barriers to the kind of circulation opportunities that encourage residents and visitors to slow down, experience vibrant street life and support development of same.
- Yes, in that more direct investment in fixed transit will be beneficial. In addition, further care needs to be made concerning commuter connections not only to Jacomo but also the SW segment of the city.
- Yes. I think it is important for a vibrant urban center, which KC badly needs.
- Yes, we need to encourage more urban development and more infill building.
   Would make KC more "cool", attracting people. Need obvious ways for visitors to get around.
- Yes We can't survive without a strong downtown.
- Yes, it identifies the right motivating factors (development, desire for convenience) that have been lacking in other efforts to develop fixedguideway system.
- o Yes.





- o [attractive and successful] brings a real energy to downtown.
- o I agree it's a good, concise statement but it is pretty general, and I don't find the bullet point approach on the display boards to be entirely satisfactory. I want to see narrative that "hangs together".
- I agree with the above statement. Kansas City needs to connect its urban neighborhoods. A stable transit system would also encourage infill development between neighborhoods, such as River Market, Crossroads and Union Hill. Eventually, such a line should reach 47th Street.
- o Yes
- Mostly but I would expand it out to include the urban core to the Plaza. I feel like connecting the river to Crown Center is a good starting point but doesn't really do a whole lot on its own. Two miles is easily walkable, bikeable, and there's already plenty of bus service. I also don't think it would stop people from getting in their cars. Connecting the river to the Plaza with rail is a game changer.
- Yes. I work in the downtown business district and would utilize a 'true' transit system almost daily. (my definition of 'true' means something beyond simply buses)
- Yes. I think that making the route attractive includes making rail opportunities available. Rail does not have the stigma that the bus has, and rail is a good gateway to other public transportation options. As the downtown corridor is comprised of many segments and sub-areas, it is important to bridge those areas together, not only for tourists, but for the thousands of downtown loop workers who still have never heard of the Crossroads, etc.
- Somewhat. It is not entirely clear from the statement which people would be served. Downtown residents? Downtown workers who live elsewhere? Tourists?
- o Yes.
- o yes, all of it.
- Yes. Kansas City is built on a north south axis, and making all of these districts (River Market, Downtown Loop, Crossroads, and Crown Center) into one downtown will assist in the continued prosperity of all of them. Plus, it helps connect tourists and convention goers to a broader range of hotels, dining, and entertainment.
- I agree. We are quickly becoming a no man's land for development and visitor conventions. We must keep ourselves viable or we lose more each week that goes by.





- No; downtown is developing, thriving, and sustaining pretty well as it is.
   Though disconnected, getting people out on the streets through walking/biking would be better.
- Transportation for the masses in the downtown area and across the metro is absolutely needed and important.
- Yes. It's necessary to ensure downtown continues to thrive and grow without having to add more parking.
- Well stated.
- Yes. Public transit allows an urban resident and visitor access to the community. With a growing "critical mass" businesses see the "supply and demand" which, of course, creates the jobs and tax revenue.
- Yes. Connecting the river market, downtown, crossroads and crown center allows people to move from destination to destination without the hassle of driving and parking.
- Yes. There is this 'gap' between the south side of the loop and Crown Center.
   A lot of empty store fronts, and sidewalks that are in terrible condition.
- o YES!!!
- Yes, having traveled to downtown KC and the Plaza area for many years, I can tell you I hate driving downtown then walking miles to get around.
- Yes. Especially with the increasing costs of gas public transit is becoming very important.
- o I absolutely agree with the statement.
- Yes, I do. However, I think that you also should look at possibly making the street car a 24 hour line. Many cities have 24 hour transit, however, Kansas City does not.
- I agree with the Purpose and Need Statement because downtown Kansas City has been neglected for far long and it seems now that we finally are bringing back the people and events to Kansas City and making it a more attractive urban center
- Yes. I think 'attractive' and 'conveniently' are more than just promotional words. If the system is easy for people to understand it would mean thousands more riders per year. Tourists and locals.
- I agree with the above statement. Kansas City needs to connect its urban neighborhoods. A stable transit system would also encourage infill development between neighborhoods, such as River Market, Crossroads and Union Hill. Eventually, such a line should reach 47th Street.
- o Yes.





## • Which mode of transportation, such as the modern streetcar or bus with a dedicated travel lane, do you prefer most for the downtown corridor? Why?

- I would prefer streetcar. I do not think a dedicated travel lane for buses is the best solution to our transit issues. I think there is a benefit to fixed tracks on the roads for retail and venders.
- Modern streetcar. See comments Re: MAX.
- o MODERN STREETCAR! A streetcar system has an appeal that a bus system can't match. On top of that, a streetcar system, using permanent rails, will offer better development opportunities since the route can't easily be switched to a different street.
- o Modern streetcar. We have a rapid bus line (MAX) and it is a joke.
- Streetcars have a much more "permanent" routing and dependability which will encourage establishment of businesses along the line.
- o Streetcar. Will be more recognizable as a "circulator" than another bus.
- Streetcar There is a "stigma" about buses to many people We are <u>way</u> behind times and other cities!
- Modern streetcar. It has a more upscale feel that I think will be more widely received. Too much negative connotation with "riding the bus".
- Streetcar Lacks the negative stigma of the poor people riding the bus!!
- Streetcar. Its affordable and attractive. Doesn't take as long to build. Probably won't break us. We can build it in phases if we decided to expand. Take up less space.
- o Modern streetcars. People just seem to like fixed rail vehicles a lot more than even the nicest buses.
- Streetcar appears to spawn development.
- Modern streetcar will establish the permanence required to attract redevelopment and retain business.
- Modern streetcar. Can be used to put people to work in construction, cleaner, more efficient.
- I like the idea of a fare card and side load buses We need fast load/unload.
- o Streetcar Would be more popular, lead to further extensions.
- Streetcar, there is a cool factor there. A bus is a bus.
- 1) Modern streetcar Feels more like true fixed rail which creates stability and raise property values along routes.
- o Streetcar.





- Streetcar More efficient, cleaner, greener, should spur economic development.
- Streetcar Buses have a bad reputation in KC streetcar mode has more appeal to young and new transit riders.
- o Modern streetcar shows a change in mode of travel.
- Streetcar. The bus system in KC isn't used because it's not convenient. And I like the idea of using electricity rather than fuel.
- o Streetcar.
- Streetcar, need to keep up with peer cities.
- Streetcar because fix rail provide \_\_\_\_\_, certainly, and energy to transit option. Buses will <u>not</u> and cannot do this.
- o Streetcar. Fixed route makes less congestion and easier to use.
- o Modern streetcar. Give us something exciting just like we were given MAX.
- Modern streetcar. I think an option w/built-in infrastructure will have a greater economic impact and also appears easier to use for people unfamiliar with transit.
- o I prefer a streetcar for the character and novelty as well as increased capacity.
- Modern streetcar = Predictable, long term transit improvement. BRT appears to be successful in KC.
- Streetcar because it can be built more easily and provide a . .
- Streetcar Seems much more "temporary travel" and quick access on and off.
   More friendly to standing.
- o I thought you said the streetcar didn't need a dedicated lane.
- o Streetcar It's more permanent.
- o Streetcar. It is more convenient than the bus.
- o Modern streetcar Less expensive than light rail, like sharing with bus lane, steps 3-4 blocks (like), and help with economic development.
- o The buses are already doing an excellent job, and the system is already set up.
- o Streetcar.
- o If the ridership is there, streetcar. Bus would be a lot more affordable.
- o BRT is cheaper but streetcars are sexier, and to get the public to accept public transportation let's go with sex appeal first.
- Streetcar. Case studies, focus groups and anecdotal evidence support conclusion that people regard streetcar or fixed rail transportation over buses.





- o Modern streetcar for clarity of route and permanence of investment.
- Modern streetcar. I think the permanence of rail is important for other lines to connect to it and to spark the development around it. It is cheaper to expand for increase ridership also.
- Streetcar but I use and like the bus too. Streetcars seem more permanent, dependable. I hope will create business development like trams and streetcars in Atlanta, Chicago, Seattle.
- Streetcar Permanence makes it always visible. In people's view bus disappears.
- o Modern streetcar, especially if it can be operated with clean energy, for the noise reduction, and emission reduction benefits.
- o Streetcar.
- o Streetcar.
- Streetcar hands down. I'd like to see it in reserved lanes, even though that requires "prying" those lanes away from the traffic engineers.
- Whatever is chosen needs the following: off board ticketing, signal-priority, dedicated right-of-way. Ideally, the vehicles should travel down the middle of the roadway, with stations in the median. As such, I would prefer true BRT (similar to Cleveland's Health Line) to a streetcar that shares lanes with automobile traffic.
- Modern streetcar.
- o I prefer modern streetcar with a dedicated lane. Without a dedicated lane and signal priority, I don't really feel like the expense of streetcar is worth it. Busses would be faster, and while that's not the whole equation, they're much cheaper. If a dedicated lane is an option for busses, why can't it be an option for streetcar? If a streetcar can get up to 40-50 mph, with a dedicated lane and signal priority, that'd be just as good as light rail. Especially if the Sanders commuter rail plan happens because those tracks would never connect to a light rail N-S spine since they're traveling E-W through the core.
- o I 100% prefer a streetcar system. The buses just have too many flaws and too low of a reputation to ever be successful on the scale I envision.
- I favor a streetcar with a dedicated travel lane. The streetcar should be expandable to future North/South stops, capable to travel at a higher speed on long right of ways (50MPH+), and not easily impeded by traffic events such as Sprint Center events, First Fridays, rush hour (though rush hour is not normally that bad on proposed routes).
- o I like certain aspects of both options, but ultimately I would prefer a modern streetcar with at-grade exclusive right-of-way and traffic signal priority.





Currently, a bus from River Market to Union Station can take 20 minutes. It would be a pity if the streetcar option didn't improve upon this.

- o Modern Streetcar. The public needs to see something different in order to start thinking differently about transit.
- o streetcars are easier to use
- Streetcar all the way. Buses with dedicated lanes can be moved and have proven to not drive private development decisions. Plus, we need to start thinking beyond the internal combustion engine as petroleum and the costs of maintaining bus fleets will increase over time.
- o I support a streetcar system as long as it easily converts to something more modern such as Portland and other cities of similar size enjoy.
- Bus with dedicated travel lanes and tickets that can be purchased before boarding.
- Busses seem cheaper, more flexible and a better option all around. A streetcar seems mostly like a waste of money designed to be used by those who think busses are for poor people.
- Modern streetcar.
- Streetcar option is sexier and has a perception of being more modern and easier to locate/use
- o I think to create a larger market you will have to appeal aesthetically which is anything but a bus. Modern streetcar. Or light rail. We need something more extensive than a bus system.
- o If I had to choose between a streetcar or a bus, I would take the street car. At least it is on a direct route without changing streets.
- MODERN STREET CAR! As similar as the options may seem, it's amazing the 'Acceptance' and 'Willingness to Use' shown by citizens when the options is light rail/streetcar options. This mode is perceived as more SAFE, CLEAN, and ACCEPTABLE by a wider array of citizens than buses
- modern streetcar
- Modern street car along the lines of San Francisco would be the ultimate draw for tourism.
- o I would prefer the streetcar. Personally I think that they look better and it offers (for the most part) a permanent route that buses just can't offer all of the time. Plus with a streetcar you can tell if it runs along a route because you can see the rails in the road. With buses you have to locate a sign to be sure and even then the routes can be confusing.
- o For KC, modern streetcars are the perfect mode. Fixed guideway systems are





- 'permanent' and attract development. A bus can be there today and gone tomorrow and does little if anything to foster development.
- The Street car is my preference, because if this city wants to attract people and business's we need to give the impression that we are a modern and developing city that incourages environmental practices.
- Right now i use a car for my mode of transportation. And because of the poor public transportation
- The streetcar. I'd rather see something with it's own right of way, existing outside of traffic, whether it's above, below or around.
- Whatever is chosen needs the following: offboard ticketing, signal-priority, dedicated right-of-way. Ideally, the vehicles should travel down the middle of the roadway, with stations in the median. As such, I would prefer true BRT (similar to Cleveland's Health Line) to a streetcar that shares lanes with automobile traffic.
- Modern streetcar.

# Which alignment alternative do you prefer most for the downtown corridor? Why?

- o Alt. 7.
- Couplet up Grand with City Market and reconnecting with \_\_\_\_\_ at Pershing.
   The Market and Crown Center <u>must</u> be included or the line is not valuable for KC residents or visitors.
- I would prefer either Main or Baltimore. Main is the logical first choice and offers a very straight route. The drawback to Main is that it is starting to get heavily congested in the loop with people coming downtown to park for P&L, Midland, and Sprint Center.
- o I prefer a couplet route up Grand, through the actual city market, down Baltimore/Main and reconnecting to Grand in front of the Weston on Pershing.
- o Main Street/Walnut, preferably on Main.
- I believe Alt #6 makes the most sense in terms of connecting both the River Market and Union Station. Mr. Kemper is already underway with "Grand on Grand" and Grand is sometimes closed for Sprint Center events.
- As long as it comes to the River Market, it is great. Our preference is to loop around the City Market rather than go through it.
- o Modern streetcar bi-directional. 3 blocks to Sprint Center and 3 blocks to convention center. Right in the middle.
- o Simple, re-concentrated single rail on Main Closer to Kauffman than Grand.





- My only preference is to put it through the center of attractions when possible but not through a street that is closed a lot i.e. Grand Boulevard – Not great thinking or planning on that one – Wrecked our nice street with Sprint Center. Put it where it makes sense.
- I prefer utilizing Grand Boulevard and Main Street because they are often wider than other streets, and utilizing two streets has the potential of attracting more riders.
- Grand Street with one street. Direct line least cost. Other areas could have shuttle connections.
- o Main Street is the best route serving the CBD and provides the best connection to expansion to the south.
- o Electric.
- Alt 2 Main Street with River Market Loop also Alt 3 with River Market Loop.
   Central location.
- o Couplet Grand and Walnut.
- Baltimore route. It is close to the residents and convention hotels. It needs to run to attractions and neighborhoods. Residents will use downtown shopping if we can get to it without getting our cars and heading to the suburbs.
- 1) Up and back along Main Street 2) Up Walnut Street and back down Main Street.
- Main Baltimore.
- Whatever route/concept selected, Main must be a part of it. Union Station must serve a hub for all future mass transportation –
- Alt 2 or 6. Central. Grand at Sprint Center closed too often, need strong connection to Union Station.
- o Single route or couplet but couplet if they encourage wider development.
- Alt 6. You won't have to worry about interference from/with events at the Sprint Center. And the couplet "shares the love" more than the bi-directional option.
- Main Street.
- Keep together in order to be simpler to gain high ridership and demand for expansion.
- Main Street with a single lane. A single lane provides simplicity and Main is the most controlled route and is also not subject to the street closures of Walnut and Grand. Baltimore is too far west.





- o I prefer bi-directional on Grand Boulevard. Main Street has MAX. Let Grand have something and I consider Grand as the main street of downtown.
- Single street down Main. One street is simple and easier for riders to use. Main is a straight shot from River Market to Union Station. Would be easy to add on to down to Plaza area. Loop through River Market to 3<sup>rd</sup> and Grand transit station.
- I'd like to see a system that is expandable in case light rail does pick up some day. We need more capacity as gas prices and vehicle ownership goes up and cleaner, quieter system to integrate into residential areas of downtown and maintain quality of life.
- Alt 3 Would serve the most people with the least disruption and keep it simple.
- o Grand singular Connects key ideas. Grand and Main coupled I know this isn't an option, but it would help influence t\_\_\_\_\_ downtown.
- Not sure, but leaning to single track because simplicity. Not Walnut (doesn't need as much help as others). Main or Grand. Maybe leaning towards Grand.
- Walnut through downtown Alt 3. Having a rail on one street will be cheaper and will have less impact.
- o Alt 6. It seems to affect the most people and real estate.
- o Couplet is preferred Because reaching more of the urban core.
- Single street routes.
- o Alt 6.
- o I prefer the Grand Boulevard only route F or not, lay additional tracks after the public demands more service.
- Alt 7, Main Street/Baltimore Avenue because: 1) It's more equidistant from Sprint Center and Performing Arts Center/Convention Center, maximizing ridership 2) Works around potential disruptions on Grand from special events that would close off the street.
- Walnut/Main couplet.
- o I prefer Walnut. I think it offers the best solution for both the River Market area and for Union Station. It also is more centered for better access to both Sprint Center and Municipal Auditorium. 2<sup>nd</sup> choice Grand. 3<sup>rd</sup> Main.
- Grand or Main Both are more public and larger streets. Would fit with the new "Make Grand Grand" project. Needs to be where lots of people will congregate. Also Grand is wide and goes to Sprint Center.
- o Whatever will maximize TOD and be likely to expand north and east.





- o Undecided.
- o Bi-directional, for economic development reasons.
- No preference.
- #1 Walnut (bi-directional) because it offers the flattest profile for walking and street cars alike. I know there area major challenges on Walnut. So #2 is Main. Grand would be nice but it is our "one great ceremonial street" and streetcars (especially centenary) would interfere with that important civic function.
- The Grand Avenue alignment seems to be the best option. It would connect Crown Center, the Crossroads, the Power & Light District, the CBD and the River Market. It also offers multi-modal options in the form of Megabus (3rd and Grand), Amtrak and the proposed commuter rail system. The Main Street alignment would offer similar advantages. The Walnut and Baltimore corridors are too narrow for a dedicated right-of-way, with median stations. The couplet alignments could confuse potential users.
- Main St. Aesthetically, it would be the best option. It is the best centralized line. It allows for integration into the full downtown residential neighborhoods. It is close to the main downtown hotels, central to the business district, and would provide an easy centralized location. For tourists, People can easily remember 'find main street'.
- o If there are dedicated lanes and signal priority, I would support Main. It bridges the gap between the convention center, P&L, and Sprint Center. It would also be a straight line all the way to the Plaza. If a couplet is required to obtain dedicated lanes, I would go with Main/Walnut because there aren't any 90 degree turns. If dedicated lanes are off the table, I'd go with Walnut because it has the least amount of traffic.
- o Alt3 (Walnut street). This isn't even the most ideal for me personally (due to the location of my office), but it clearly maximizes the benefit to the most people while travelling directly through the best areas of downtown. Grand St. makes sense from the perspective of traffic congestion (since there is much less) but it is too far east and doesn't portray the best image of KC to visitors. Baltimore does not make sense at all due to the fact that it completely bypasses most of P&L and Crossroads which would prove to be a mistake in the long-run. Walnut is a beautiful street which traverses the best part of P&L and Crossroads while still being just a short block from Sprint Center. Hands-down the best option.
- My preference is for the Main and Walnut couplet, but I would also be for the Main only route. The couplet would work well in my mind because it would allow a right of way to be taken from each street, would expose riders to more businesses, allow an ease of recognition for Main=South/Walnut=North or the inverse, and encourage downtown riders to walk a block occasionally from one





- direction to another (not unlike how subway entrances are often a block apart for the same stop).
- Delaware to Main Street seems the most logical choice, as it requires no turns. If the inconvenient and obnoxious Main Street MAX route convinced me of anything, it's that transit should go in straight lines as much as possible.
- Both northbound and southbound tracks on one street probably Grand Avenue.
- o Main Baltimore, it seems more point of interest centric. equidistant from the performing arts center and sprint center only a couple blocks away.
- o I believe that the best alternative is the Main Street/Walnut Couplet. By spreading the line over two streets, you can create a broader area that is walkable and prone to infill development. Main Street is the backbone of the City, and it naturally splits down Walnut after the railroad crossing. In the future, an expanded streetcar system should go all the way down Main Street to Waldo (via the Country Club Right-of-Way) as it once did. Bring back the trolleys!
- Let's dedicate one street for this system. Main Street would be most desired. It places stops nearer the new Performing Arts complex. The younger crowd can walk to the Power and Light Dist.
- Walnut bi-directional. This would balance both being in the center of the loop and traveling through dense areas. Another recommendation is to make Walnut like Nicolett Mall in Minneapolis, MN, where no car traffic is allowed, buses only. I would also like to see a bike lane mixed with the streetcar on Walnut with no auto traffic.
- o Only Main Street. No couplets... transit is hard enough to use if you're not a regular rider. Also, it should be fare-free!
- O Grand is not a good option because of occasional closures at Sprint Center. I like the couplet idea to share the benefits/costs with a larger pool of stakeholders. But it needs to be simple to find for people not familiar with downtown so I am leaning towards one of the bi-directional routes. I like the Main Street option except that traffic can already be pretty congested around 11th Street.
- o If I have to choose it would be the bi-directional on Baltimore. This allows (with extensions) for the Crown Center region, Union Station and the closest to Bartle and Kauffman. Those to the east have a younger demographic (P&L, Sprint).
- o Main st.
- South on Grand, north on Main; with stops at Crown Center and Union Station (big visitor areas).





- North on Walnut South on Grand, terminating at Union Station (return US to a transit HUB!) Placing the lines a block away will create more street walking traffic and provide consumers to businesses as citizens walk a block to return the opposite direction. Splitting the North and South would also seem to be more feasible in terms of street available to use. Separate lines would also appear to give a larger system appearance and encourage connector routes. Simple math also is that it would affect and service more locations.
- o use main street both ways
- o I don't care. Point to point is the most important concept. Anything from the river front to the plaza will produce ridership.
- The Main St. corridor is nice because it runs through the middle and offers about equal walking distance to most parts of the downtown loop. However I also like any of the couplet routes because I feel they offer benefits to a wider area.
- o Either both ways on Main or one way on Walnut and the other on Main are the most centrally located so probably preferred from that standpoint. Grand being the widest street would be better from that standpoint.
- o I prefer Grand Avenue, because the MAX already runs down main street, and having a MAX line and a street car might get clustered. Also, the city recently decided to renovate Grand.
- I would rather use public transportation because of the high prices facing are country,
- Alt 2 and Alt 6. Good and central. Could take it to the government buildings, or Power and Light/Performing Arts center, YJ's or the federal district on the east side of downtown.
- O The Grand Avenue alignment seems to be the best option. It would connect Crown Center, the Crossroads, the Power & Light District, the CBD and the River Market. It also offers multi-modal options in the form of Megabus (3rd and Grand), Amtrak and the proposed commuter rail system. The Main Street alignment would offer similar advantages. The Walnut and Baltimore corridors are too narrow for a dedicated right-of-way, with median stations. The couplet alignments could confuse potential users.
- Main St.
   Aesthetically, it would be the best option. It is the best centralized line. It allows for integration into the full downtown residential neighborhoods. It is close to the main downtown hotels, central to the business district, and would provide an easy centralized location. For tourists, People can easily remember 'find main street'.





#### • What other comments or questions do you have?

- o I'm so excited! This will weave so much together.
- No MAX! Timeliness and trendiness of modern streetcar a must. The River Market and Crown Center must be integrated stops. Excited to hear more! Great project.
- Please involve downtown neighborhood association and downtown residents during the process to select the route.
- \*) Put the maintenance shed just north of Washington Park by the railroad tracks. \*) Please do not pick up a bi-directional scheme down Grand. This could end up being an "edge" not a connector. Very little development is east of Grand. \*) Most importantly This project must connect the City Market to Crown Center. It will be a grave failure to stop short of these 2 locations. We have to help pedestrians over our man-made hurdles train tracks, 670, I-70.
- I believe that most great cities have accessible public transportation. Once a starter line such as this is established, more will develop. Kansas City will become a great city.
- o By using Main/Walnut with the Grand Avenue redo occurring it would seem we would get the most bang for the buck 3 streets of improved amenities. Also both Main and Walnut have lots of property available for infill. I would like to see the route to go through the River Market itself (Walnut). That may ease congestion in the Market on Saturday mornings, if suburban shoppers could hop on/off and park in one of the many surface lots on 7<sup>th</sup> and 8<sup>th</sup> Streets. Also important to have easy access to Crown Center with the aquarium opening next year. There should be an infill of family activity in the Union Station/Crown Center area.
- o SEE ATTACHED. City Market would like to meet with the consultants please.
  - Attachment: Transit Options Pros and Cons
    - 1. Safety issue on weekends with the amount of people in the Market Square and traffic in the streets.
    - 2. What kind of sound or light warnings would take place when the car was coming and going through?
    - 3. Would it be possible to put in street blinking lights along the Market Square part of the route?
    - 4. We would still need to close the Market Square to other traffic on weekends so there would be some sort of gat at the 5<sup>th</sup> and 3<sup>rd</sup> Street entrance/exit that would open for the car to come through. If a manual thing would staff then be paid for from the transit?





- 5. Could increase attendance.
- 6. Could increase tenant sales.
- 7. If the two above work, then it would along us to increase psf rental rates.
- 8. Would increase visibility inside the Market
- 9. Lots revenue thro ugh loss of concerts (\$45,000 70,000 annually)
- 10. Would benefit from the marketing of the transit system via route information and being a start/end point?
- 11. Would be a big re-education process, would this be included in the costs outlined for the project?
- 12. Lost parking spaces at circles could be recouped if installed along front of CM4.
- 13. Would get a lot of the decaying curb areas repaired and would get rid of the circle drive.
- 14. It would bring more commuters (downtown office parkers) to the area which would mean less available parking.
- 15. Would ATA line still run to the area?
- 16. There is also the option to open Main Street back up behind the shops if needed.
- 17. One person said it would make the Market sexy...
- Need a transportation hub in the Crossroads to connect east-west.
- Well I want to connect the 18<sup>th</sup> and Vine District with a loop from Crown Center to 18<sup>th</sup> and Vine and back to Power and Light District. I believe wonderful things will happen with that loop. Right now build the starter line and as soon as possible let's connect it to 18<sup>th</sup> and Vine with a loop.
- Make the streetcar barn an attractive destination as well.
- It is time to get this done. We will slip from a second to a third tier city if we don't.
- o River Market Community Association is split on whether streetcar should come through or circle around City Market area (safety of pedestrians was issue).
- Will this replace the Main Street BRT? Who will operate? Baltimore is too far west.
- o Grand Avenue is River Market Neighborhood, not Walnut through City Market.





- Please be careful about integration with bicycle routes and include space for bikes on streetcar vehicles.
- o Take the focus off of Main Street and put it on Grand Boulevard.
- This kind of project would really improve my quality of life by fostering more housing, generating more retail (Target?! Please!) and giving downtown tourists a novel way to see what we have to offer.
- Connect line directly to Union Station above all else.
- o Riding cost? I like Portland's that you pay to get downtown, but then once downtown it is free. Quick encouragement for riders is key.
- o Finally Public transit for KC Can only see positives for the urban core and KC.
- o Go to Crown Center not through. Go through City Market.
- o Thank you And keep up the good work!
- o Good job on presentation.
- Would vote for any of the routes.
- Please have a way to take bicycles on streetcar. Make sure it goes to Union Station! Have good ped friendly stops and include ADA needs. Grand couplet is good or Grand or Main straight lines.
- Combination property tax/sales tax within the district seems like the appropriate funding mechanism. If security needs can be met, showcase the streetcar in an architecturally stunning glass building when not in use.
- o Transit for economic development. Period.
- o Really exciting!
- This is an important project and could be a turning point for the city. To
  prosper, Kansas City must increase its population density. A denser urban core
  will need fast and efficient transit. However, it needs to be executed properly.
- o Whether we go with streetcar or bus, off board ticketing should be a very very high priority. That is one of the biggest delays when riding 'BRT' through KC. That and the Main Street MAX should be straightened out. All those twists and turns more than doubles the amount of time it should take to get through downtown. Another thing on dedicated lanes, this is more than enough parking downtown to take away some on-street parking. Kansas City is the easiest city I've ever parked in. Parking is no excuse. Neither is traffic because we don't have any and there are plenty of streets to choose from when traveling from N-S through the CBD.
- This is an issue that I am very passionate about so please feel free to contact me
  if there is any way that I be of any assistance.





- My ideal vision for the streetcar would be a grassed over right-of-way, expandable to the North and South, running frequently (10 minutes or less), and consistently (even in evenings and on weekends). Fare would be free, as long as it is only a 2 mile line, since it would otherwise overlap existing service from the MAX. This free service would also encourage riders to explore other opportunities and become excited about future expansion of regional transit. While financing may be a concern, a free fare would be an investment in recruiting future transit riders and in promoting the great features of our downtown.
- I recently visited the Phoenix light rail maintenance facility as part of a model/historical railroad convention. I have photos if anyone is interested.
- I think it would be a grave mistake to not think about the future expansion of this initial streetcar system now. We need to strategically think about the historical precedence of the area as well as the potential for future growth and development. The right-of-way is already there on Main Street, and we have the ability to tie in the entire city to downtown with one, albeit large, public investment. We could revitalize and entire corridor from downtown to the Plaza and on to the streetcar suburbs built by JC Nichols that no longer have a street car.
- Let's get on with it. Studies are going to kill it for another decade. We need to do a quick finish to the planning and put this to work!
- In all honesty, a better alternative would be to expand bus service all over the metro, and not just one area. I would prefer to see a subway-style BRT system that connects all corners of the metro in dedicated lanes, with nice stations were passes can be purchased before boarding.
- Need to quickly get a list of funding options and get moving on which ones are most feasible. Hopefully there will be enough funding to keep it fare-free!
- I think the financial plan is the correct approach to avoid another city wide vote that will fail. Moving forward with a starter line will surely be a seed for further expansion as long as there aren't any missteps that generate negative public opinion.
- Bi-directional would have "double" the car movement which is very important to show – Availability and for a two-mile distance is worth getting on for either direction.
- I propose we close main street to all car traffic and make it a streetcar/light rail system only.
- Let us not study this to death.
- Excited to see the next steps!
- o This must be only the first step in a total transportation system of spokes if you





- expect to draw people downtown (DT). DT to sports complex, DT to airport, DT to Johnson County and DT to south county
- o I'm hopeful the plan is for the Downtown-Union Station line to be only a starter line and an extension south to the Plaza would follow as soon as funding permitted. That is definitely the core route with the best ridership potential.
- Yet, again I would like to emphasize the fact that we need more night and weekend transit options for Power and light, The Sprint Center, Concerts, First Friday, Crown Center, Union Station, River Market, and Out of towners. The transit on night and weekends is lacking, and we need service during these times that runs late enough and often enough to be convienent So people will use it.
- It's about time...
- This is an important project and could be a turning point for the city. To prosper, Kansas City must increase its population density. A denser urban core will need fast and efficient transit. However, it needs to be executed properly.

#### **Other Comments**

#### • Downtown Neighborhood Association Position Statement:

- o Residents of the Greater Downtown Kansas City area are passionate about improving the state of transit in our neighborhood. Evidence for the importance of transit to Downtown, and the desire to improve it, is seen in residents' consistent support for transit ballot initiatives. Transit is also a critical part of realizing the goals of the Greater Downtown Area Plan and extending the benefit of the investments already made.
- As transit plans have come and gone, lack of coordination between interest groups has weakened previous proposals to the extent that Kansas City continues to sit on the sidelines of the modern transit revolution. However, the latest proposal for a Downtown Streetcar represents a tremendous opportunity to make a significant improvement for Downtown and a major step toward building a transit culture in Kansas City.
- Because of this incredible opportunity, the neighborhoods of Downtown Kansas City would like to express our strong support for the streetcar project. We would encourage the project team to be innovative and consider any local funding options that can help make the project a reality and to do so as quickly as is prudent, setting aggressive timelines to begin realizing the benefits of this system as soon as possible.
- We also offer the following recommendations:





- The system should utilize modern streetcar technology, capable of delivering a rider experience comparable to light rail. The route should utilize a single street for both directions of travel to eliminate rider confusion, with considerations made for the best solution for circulation at the ends of the route. The route should serve the River Market neighborhood on the north and adequately serve Crown Center and Union Station on the south.
- Approved by the Board of the Downtown Neighborhood Association
- o Lindsay Tatro, Downtown Neighborhood Association President

#### Phone Calls

- Anonymous: Use Main Street Let it rip. Accommodate Performing Arts Center traffic, so Avoid Grand. Is it possible to run the streetcar without overhead lines.
- Anonymous: New to Kansas City and attended open house but learned nothing. Don't hurt Crossroads pedestrian traffic. Isn't this project like the MAX? What are the funding mechanisms?
- Organizing for a Downtown Streetcar: Would like to submit letter of support from four affected neighborhoods (Columbus Park, Downtown Neighborhood, River Market, and Crossroads).

#### Emails

- O I have read the FAQ and it did have a lot of good info. I have a few follow up questions that maybe you, or someone there can help answer about the proposed street car. I realize you are just in the study phase and may not have all the answers yet, but any details or thoughts on where things are leaning would be very appreciated.
  - I see that in the FAQ it states that "streetcars usually have signal priority". The MAX bus line was supposed to have signal priority as well, but somehow that got cut out along the way essentially neutering the express/speed part of the service. Is this a negotiable point of the project or is it a definite? (My opinion/feedback is that it is a must).
  - How exactly is signal priority defined?
  - Are dedicated lanes being pursued at all (in part or even just portions of the line)?
  - Is any consideration being given to speed/total travel time from River Market to CC?
  - Will there be street kiosk for pre-boarding ticket purchasing? (there should!)





- Is frequency of trip going to be a priority? (Frequency is good!)
- Is 24 hour service being considered? (I think it should)
- Will people be able to board with bikes? (they should!)
- Is it being considered to offer free service when this first opens? (get people used to riding it! or at least those who will be paying the transit district tax for it).
- If everything goes as smoothly as possible...best case scenario, when will I be able to ride this new streetcar? How long will the project take to build and be operational? If there are questions that cannot be answered yet b/c its still just a study, when will these questions be answerable? at what point in the process?

So in case you couldn't tell I pretty much asked questions to which my feedback or answer would be YES! as I know you are still collecting community feedback and wanted to give mine while also asking for some more info. As for the street it should be run on...Main is my pick. Any street besides Grand would be acceptable, but I am not a fan of the couplet circuits. Keep it all on one street for ease of use for those who are unfamiliar. Thanks for your time and responses! And please, get this thing done!

#### Letters

- I am willing to offer thoughts pertaining to the Downtown Corridor
   Alternatives Analysis project presently being undertaken. I would appreciate
   your including these comments with others submitted to MARC as part of your
   public involvement phase of the project.
  - As you recall, I served on the Citizens' Task Force which developed a light rail proposal. You will also recall that I served as representative of the Clay County Commission on the North/South Transit Corridor alternatives analysis project, and later as a representative of the Cla County Commission which selected a consultant to perform the initial rail corridor analysis.
  - I am not writing today as a representative of anyone other than myself, though wished to identify previous responsibilities to emphasize my familiarity with critical issues pertaining to your present alternatives analysis project.
  - Transportation Mode: The first question is whether a s street railway system or a MAX type bus system or some combination represents the best strategy for fulfilling Kansas City's needs.
    - 1. In general, I am of the view that a street railway system has better long-term potential for promoting redevelopment of





- downtown's empty or underutilized land (I include most parking lots and especially flat parking lots as underutilized land). This property generates very little in tax revenue though demands costly services such as water and sewer service, even though only storm drains may be connected to the sewer lines.
- 2. Construction of a street railway route could—and should be augmented with a redesign of certain bus routes, combined with possible creation of certain feeder services which might at a later date be converted to street railways.
- 3. Promoting mixed use (office/retail/residential) development is a highly desirable goal. A street railway system represents a long-term investment which is psychologically conducive toward promoting the long term redevelopment of downtown. I see this as desirable.
- 4. On the display maps presented at your public hearings, you should only a few routes. I would recommend showing both rail routes combined with connecting bus routes illustrating how mixed use c ould be mutally supporting.
- Downtown Routes: It appears that the planning team recommends side-by-side street routes so that passengers would only need to know to walk one block in order to catch a car going in the other direction.
- Grand Boulevard: I would not recommend any routing which includes Grand Boulevard (rather than Grand Avenue which is identified on your maps; it's been over a century since that section was known as Grand Avenue). There are two reasons I would exclude Grand Boulevard:
  - Inadequate traffic demand along Grand. It may be desirable to include Grand at some later date in some later phase. However, Grand has too few traffic generators to be included when compared to other routes.
  - Sprint Area. Management at the Sprint Arena has been uncooperative and, in fact rather demanding and arrogant when dealing with transit. There would be an inevitable conflict between needs of the street railway system and demands of the Spring Arena management. The initial phase should avoid areas of conflict and instead focus on opportunities which would assure short term success.
- Walnut/Main orMain/Baltimore: Walnut would likely be less desireable than Baltimore as there are fewer office buildings near or adjacent to Walnut than Baltimore. Baltimore also has the Hotel Muehlbach and the Hotel President and is one half block from the Hotel Phillips. Main





Street includes the Power and Light District, several major office buildings, and the eastern edge of the Crossroads district, in addition to Union Station.

- Other Alternatives: Wyandotte is not included on the list of potential routes, though in my judgment, deserves consideration. Wyandotte includes the eastern entrance of the Municipal Auditorium/Bartle Hall Complex, the Kaufman Center for the Performing Arts, the Marriott Hotel, the Hotel Muehlebach, the Aladdin Hotel (Holiday Inn), the Crowne Plaza Hotel, and more of the Crossroads district than other streets.
- Comment Pertaining to the Kauffman Center for the Performing Arts: It is my firm conviction that the Kauffman Center will be a far greater traffic generator than what is now being considered. I also serve as editor of the newsletter for one of the Kansas City Symphony's volunteer auxiliary organizations, and am aware of events planned for two and three years hence which appear to be almost completely unknown among Kansas City's leadership. I fervently believe that the new performing arts center will have a far greater—and more profoundly positive impact on the downtown area than is presently realized.
- Downtown Routing Conclusion: My assessment is that a Main/Walnut routing through downtown has the greatest potential for success. Although this would spread the placement by two blocks rather than one, I doubt that two blocks spacing would significantly diminish ridership for downtown passengers.
- Union Station and Crown Center Routing: The proposed routing including Main/Pershing/Grand is the best alternative in the this area.
- River Market Routing:
  - Owing to the remarkable transformation of the River Market area into a residential area, this presents the greatest challenge to define the best possible route. Delaware has the potential for reevolving into a retail district while remaining commercial areas are likely to be transformed into residential. The Columbus Park area to the east of the River Market is also showing signs of regeneration and regrowth.
  - I have no specific recommendations to make other than a streetcar line should serve the River Market, and that routing should avoid the hill on Fifth Street between Delaware and Baltimore.





3. I would encourage the planners to at least explore the possibility of using the former Kansas City Southern viaduct over the Crosstown Freeway. The viaduct was constructed when the Crosstown Freeway was originally built so that the KCS could continue to serve Folger's Coffee and the printing firms downtown from Grand Avenue yard (which served the then KCP&L steam plan). The Crosstown Freeway occupies the valley between the River Market and what is now Sixth Street. This rail right-of-way is essentially intact between Third Street and Seventh Street. Although this segment of the route would serve few passengers, it would be an easy logistical way of getting across a highway, and get into downtown where there is some employment and residential activity in and about the clothing district and what was a once time the theater district (the Savoy Hotel and Coates House are the last survivors from this period in Kansas City's history).

#### Other Recommendations:

- I recommend that planners at least consider showing how revision of existing transit routes and/or creation of circulation feeder bus routes could be transformed into streetcar routes at a later date. One of the seling points (which was not well promoted) with the light rail plan was how the system could be expanded. Feeder routes which should be considered for future expansion would include:
  - o 18<sup>th</sup> & Vine to the Crossroads at some connecting point on the streetcar route.
  - o Union Station to the IRS building and to Federal Reserve Bank during certain hours.
  - o River Market/Columbus Park circulator.
- I hope these ideas are useful to you and the planning team which is exploring downtown street railway routes. As always, I am available to assist you when ever needed.



Open House #2 – August 30, 2011 Meeting Materials and Summary Results

#### See What's on Display

We encourage you to walk around the Grand Hall and review the Downtown Corridor AA exhibits. As you do so, please provide your comments to the study team representatives who are positioned near each exhibit. Your input is important to the project, so please share your thoughts, ideas and concerns with us. We want to hear what you think.

Name of Presentation Board	Information Described on the Board			
Welcome	Includes information about today's meeting.			
Process and Schedule	Describes the planning process and timeframe for the Downtown Corridor AA.			
Purpose and Need	Outlines key elements of the Downtown Corridor AA Purpose and Need Statement.			
Modes of Transit	Describes the differences between two modes of transit: the modern streetcar and a bus with a dedicated travel lane.			
June Alignment Alternatives	Maps spanning the area from the River Market on the north, through the Central Business District and the Crossroads areas to Union Station and Crown Center on the south and showing the initial set of seven alignments for the Downtown Corridor that were presented to the public in June.			
Tier 1 Evaluation	Describes the evaluation criteria and results of the process to narrow the seven alignment alternatives to two.			
August Alignment Alternatives	Maps demonstrating the two alignment alternatives that will be analyzed in a more detailed fashion during the next few weeks to arrive at a single alignment.			
How to Pay For It	Outlines the guiding principles and potential sources of funding for the starter line.			
Next Steps	Involves the immediate next steps in the project schedule, including a single Locally Preferred Alternative for mode and alignment and a corresponding financial plan.			
Stay Informed	Describes how to access additional project information and who to contact for the project.			

#### Would you like more information?

Bookmark MARC's KC Smart Moves website, **www.kcsmartmoves.org**, and check back often to find project-related materials, announcements, and upcoming events!

You may also contact Triveece Harvey, AICP, at Patti Banks Associates to schedule a presentation for your stakeholder group. You can reach Triveece: by email at *tharvey@pbassociates.com* or by phone at 816-756-5690 ext. 3038











# Participate in the Open House

Modern streetcars like the one on display today, expanded bus service/Bus Rapid Transit (BRT) and "no-build" alternatives are being studied as part of the Downtown Corridor AA. The AA will define a starter line for an expanded regional transit system that serves downtown. The Regional Transit Alliance (RTA) is hosting the Streetcar Party to give you a "sneak peek" at the type of streetcar and bus alternatives that are currently under consideration through the Downtown Corridor AA.

The Downtown Corridor AA open house is open all day until 6:30 p.m. You are welcome to:

- Review exhibits that describe the planning process, schedule, purpose and need for the Downtown Corridor AA, as well as the transit mode and alignment alternatives currently under evaluation.
- **Discover the differences** between the modern streetcar and a bus circulator that uses a dedicated travel lane.
- Speak with staff about the Tier 1 evaluation process used to narrow the seven alignment alternatives shown to the public in June to the two on display today.
- Learn about the detailed Tier 2 analysis
  that will be applied during the next few weeks
  to determine a single, preferred alternative for
  alignment and mode.
- **Fill out a comment card** before leaving the open house.

# Open House #2

# Continue the Party in the Grand Hall!

The city of Kansas City, Mo., Kansas City Area Transportation Authority (KCATA), Jackson County, and Mid-America Regional Council (MARC) are displaying **Downtown Corridor Alternatives Analysis (AA)** exhibits related to transit modes and the two alignment alternatives for the downtown starter line in **Union Station's Grand Hall** on **August 23 from 8 a.m. to 6:30 p.m**. for you to review during the Streetcar Party.

Drop in any time – It's an open house!





Meeting participants talked with staff



# August Alignment Alternatives Background The Department Capital A Air of Saved help to transit a primarie a parameter and a

The Downtown Corridor AA is a focused look at transit options in a narrow two-mile corridor running from the River Market on the north, through the Central Business District and the Crossroads areas to Union Station and Crown Center on the south. Its purpose is to:

- Provide an attractive transit option that will more conveniently connect people and places within the Downtown Corridor.
- Support regional and city efforts to develop downtown Kansas City and the Downtown Corridor as a more vibrant and successful urban center.

The project is needed to help the Downtown Corridor **connect, develop, thrive and sustain**. The analysis included with the Downtown Corridor AA is positioned to advance a Locally Preferred Alternative (LPA). The LPA is a Federal Transit Administration requirement, and is necessary in order to obtain funding for the starter line. The LPA will:

- Support Downtown goals.
- Leverage existing investments.
- Elevate the quality of our regional transit system.
- Provide continued growth of a strong, vibrant urban core.

#### **What's Next**

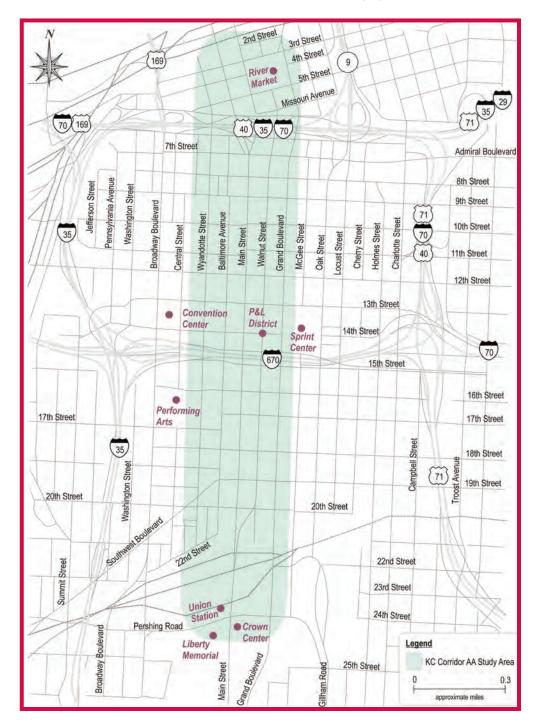
The Partnership Team and consultants will begin a very detailed analysis of the two alignments and two modal alternatives on display today. Analysis will include, but is not limited to an assessment of:

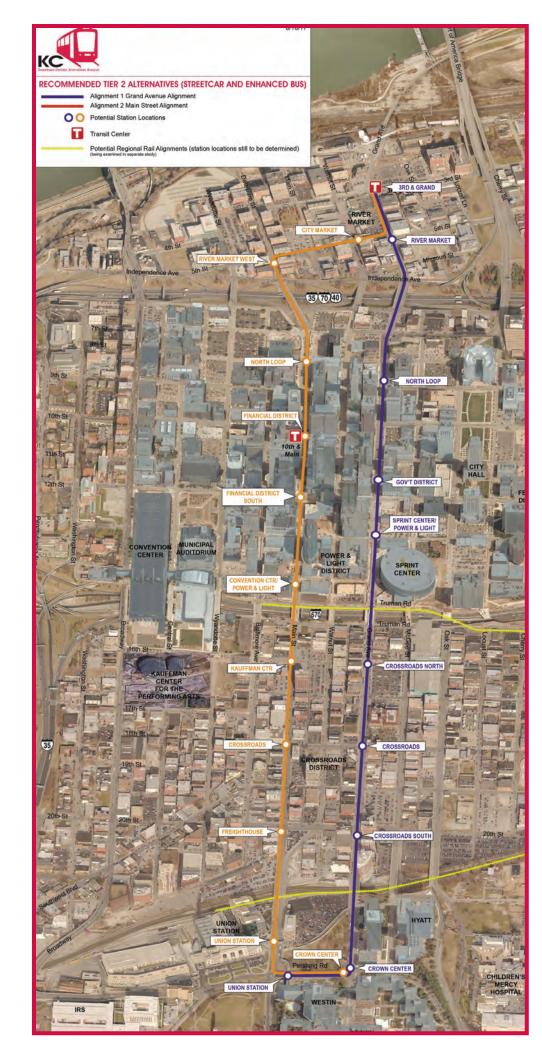
- Ridership forecasts.
- Redevelopment potential.
- Costs for construction, operations, and maintenance.

The analysis will be completed within the next few weeks and will result in a Locally Preferred Alternative (LPA) for a transit connection between River Market and Union Station/Crown Center with a corresponding strategy to fund it by mid-September. The LPA and financing plan will be presented to the community at a public open house and a series of City Council presentations.



The Federal Transit Administration is funding the study as a required step to a starter line becoming eligible for federal construction funds.







# Welcome

- Thank you for joining us at today's **Downtown** Corridor Alternatives
   Analysis (AA) public meeting!
  - Open House:8 a.m. 6:30 p.m.
- What You Can Do
  - Review the exhibits
  - Ask questions
  - Tell us what you think

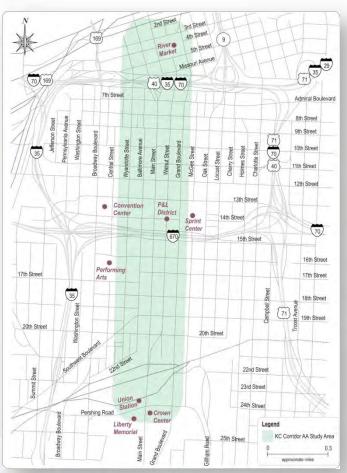


Please fill out a comment card before you leave.





# **Overview**



## **Downtown Corridor AA**

- Focused look at transit options in a corridor running from River Market to Union Station / Crown Center
- Result will be a single Locally
   Preferred Alternative, supporting downtown goals, investment, and the regional transit vision as well as the recommendations of Kansas City's Greater Downtown Area Plan
- Process funded by the Federal Transit Administration





# **Process & Schedule**

## **Stakeholder Outreach**

### Ongoing Meetings

- Neighborhoods
- Civic leaders
- Transportation groups
- Elected officials
- Downtown Parking and Transportation Commission
- Business/Economic development community
- Media

### Three Public Open Houses

Held at key milestones

### **Time-frame**

### April – June 2011

- Purpose and Need Statement
- Project goals and objectives
- Identification of alternatives

### July – September 2011

- Detailed alternatives assessment
- Alignment and mode determination
- Financial strategy formation

### October – December 2011

 Detailed technical and financial analyses

### January 2012

Final report to Federal Transit
 Administration





# **Project Purpose**

The purpose of the project is to provide an attractive transit option that will more conveniently connect people and places within the Downtown Corridor, and support regional and city efforts to develop downtown Kansas City and the Downtown Corridor as a more vibrant and successful urban center.



# **Project Need:**

# Connect, Develop, Thrive & Sustain

### **Connect**

- Improve circulation within downtown
- Connect downtown activity centers
- Enhance and integrate multimodal transportation options
- Improve effectiveness and efficiency of existing transit services
- Improve pedestrian environment and accessibility
- Provide access to parks and recreational facilities



- Encourage development and redevelopment
- Provide a catalyst for redevelopment
- Increase number of downtown residents
- Support downtown's historical urban fabric and form
- Support transit-oriented development/ minimize the need for parking



# **Project Need:**

# Connect, Develop, Thrive & Sustain

## **Thrive**

- Strengthen downtown districts and support existing businesses
- Provide additional services for residents
- Support visitor and tourism activities
- Avoid future congestion
- Serve transit-dependent populations

# Sustain

- Promote long-term sustainable development
- Reduce vehicle-miles traveled
- Improve air quality
- Improve public health
- Promote walkability





# **Modes of Transit**

### **Circulator Bus**



- Generally diesel-powered
- Generally on-street, but can have separated, fixed guideway
- Can carry up to 75 passengers

### **Modern Streetcar**



- Generally electrically powered
- Fixed guideway (rail); shares traffic lane with autos
- Can carry up to 120 passengers





# **Tier 1 Evaluation**

Based on the four Strategic Principles from the Purpose and Need

CONNECT DEVELOP

THRIVE SUSTAIN

Each principle includes multiple objectives that provide criteria for evaluation.





# **Tier 1 Evaluation Results**

	<b>1</b> Grand	<b>2</b> Main	<b>3</b> Walnut	<b>4</b> Baltimore	<b>5</b> Grand/Walnut	<b>6</b> Main/Walnut	<b>7</b> Main/Baltimore
CONNECT	Best	Best	Good	Good	Fair	Fair	Fair
DEVELOP	Fair	Best	Good	Best	Best	Best	Best
THRIVE	Good	Best	Good	Good	Fair	Fair	Good
SUSTAIN	Best	Good	Fair	Good	Good	Fair	<b>Fair</b>
SUMMARY	Best	Best	Good	Good	Fair/Good	Fair/Good	Fair/Good





# Tier 1 Findings

### **Grand Boulevard**

- Close to downtown activity centers
- Close to employment
- Integrates well with existing transit service
- Fewer utility impacts
- Strong public and stakeholder support

### **Main Street**

- Close to downtown activity centers
- Close to visitor infrastructure
- Integrates well with existing transit service
- Development potential
- Strong public and stakeholder support





# **How to Pay for It?**

### Guiding Principles

- No dedicated city-wide sales or property tax
- Fixed rail creates "permanence" that spurs investment
- No diversion of KCATA funding

### Potential Sources of Funding

- Rider fares
- District sales tax and/or special assessments (only within corridor)
- Federal grants
- Advertising and naming rights
- Other sources consistent with guiding principles







# **Next Steps**

## **Through September 2011**

- Tier 2 evaluation of the two alignment and mode alternatives. Tier 1 evaluation factors are included with the detailed Tier 2 analysis. Such factors include:
  - Stakeholder input
  - Potential ridership
  - Construction and operating costs
  - Economic development potential

- Traffic impacts
- Right-of-way issues
- Land use impacts
- Community issues
- Environmental and historic resource impacts
- Alignment and mode determinations
- Financial strategy formation
- Third public open house
- City Council presentations





# **Stay Informed**

- Keep up with the latest on the Downtown Corridor AA by:
  - Bookmarking our web siteat: <a href="https://www.kcsmartmoves.org">www.kcsmartmoves.org</a>
  - Scheduling a presentation for your group via:
    - Triveece Harvey,
       Patti Banks Associates at:
       <u>tharvey@pbassociates.com</u>
       and 816-756-5690 x. 3038





#### **Technical Memorandum**

### Results of Tier 1 Screening

Draft: August 15, 2011

### **Executive Summary**

The evaluation process developed to select the Locally Preferred Alternative (LPA) for the Kansas City Downtown Corridor Alternatives Analysis (Downtown Corridor AA) consists of a two-step process. The first step involved an initial Tier 1 screening intended to narrow a long list of potential alignments into a short-list of alternatives, followed by a Tier 2 process in which the short-listed alternatives will be evaluated in more detail. This memo reports on the Tier 1 screening process.

The study team identified seven Tier 1 alignments that could potentially meet the goals and objectives of the Downtown Corridor Study. These alignments are intended to be "mode neutral" and could reasonably accommodate a variety of transportation modes, including streetcar or enhanced bus service. The Tier 1 alternatives were screened according to 13 criteria that are directly tied to the project goals articulated in the Purpose and Needs statement (see Table 1). These criteria include both qualitative and quantitative measures that were examined at varying levels of detail. The screening process focused on how well the alternative alignment fulfilled the screening criteria objective and assigned each alternative a rating of "Best", "Good", and "Fair". The ratings are relative to the other alternatives and should not be interpreted as an absolute score.

The differences between the alternatives are those that offer more potential and better choices in terms of improving transportation linkages, supporting existing activity centers and strengthening development potential. The preliminary results of the Tier I screening process show that **Grand Boulevard and Main Street received the highest number of "Best" ratings**, and it is recommended that these two alignments be brought forward for detailed analysis in Tier 2 (see Table 2).

- Grand Boulevard received best ratings for access to Downtown Kansas City's employment
  districts as well as other major activity centers. The alignment also offers potential to reduce the
  amount of surface parking downtown due to its proximity to several surface parking lots. Grand
  Boulevard also has the least impacts on existing utilities.
- Main Street received best ratings due to its location close to most of Kansas City's major activity
  centers and visitor facilities. Main Street offers the best potential to improve downtown
  circulation and to be integrated with existing transit services. In addition, the alternative ranked
  well in terms of being able to realize development and redevelopment potential. The alignment
  also received strong support from stakeholders and members of the public.

#### **Overview**

The evaluation process that has been developed to select the Locally Preferred Alternative (LPA) for the Kansas City Downtown Corridor Alternatives Analysis (Downtown Corridor AA) consists of a two-step process:

- An initial Tier 1 screening process that focuses on narrowing a long list of potential alignments into a short-list of alternatives.
- A Tier 2 evaluation in which short-listed alternatives will be evaluated in more detail.

This memo presents the results of Tier 1 screening process. The following text describes the screening process and results. Summary and backup documentation is included as Tables C1 - S3 and Figures C1.1 - S2.2.

#### Tier 1 Alternatives

The study team identified seven alignments that could potentially meet the goals and objectives of the Downtown Corridor study. The alignments are intended to be "mode neutral" and could reasonably accommodate a variety of transportation modes, including streetcar or enhanced bus service. The Tier 1 alternatives consist of two basic types: (1) "bi-directional" alignments in which service would operate in both directions along the same street and (2) "couplet" alignments in which service would operate northbound along one street and southbound along a parallel street. The Tier 1 alternatives consist of seven alignments: four bi-directional alignments and three couplets (see also Figures 1 and 2).

#### **Bi-directional Alternatives**

- 1. Grand Boulevard
- 2. Main Street
- 3. Walnut Street
- 4. Baltimore Street

#### **Couplet Alternatives**

- 5. Grand Boulevard/Walnut Street
- 6. Main Street/Walnut Street
- 7. Main Street/Baltimore Street

For each alternative, there are multiple options for how the service would serve the northern (River Market) and the southern (Union Station and Crown Center) ends of the Downtown Corridor. Because each of the Tier 1 alignments could be configured in multiple ways, the Tier 1 screening process did not consider service to the alignment ends as part of the screening process.

### **Tier 1 Screening Process**

The Tier 1 alternatives were screened according to 13 criteria that are directly tied to the project goals articulated in the Purpose and Needs statement (see Table 1). These criteria include both qualitative and quantitative measures that were examined at varying levels of detail.

For each criterion, the study team considered how well the alternative alignment fulfilled the screening criteria objective and assigned each alternative a rating of "Best", "Good", and "Fair". The ratings reflect relative, rather than absolute scores. The screening process involved combining qualitative and

quantitative data as well as comparing and contrasting the alternatives against each other. As a result, an alternative's rating can only be interpreted relative to the other alternatives. Additionally, because the alternatives are located close to each other, the differences between alternatives was subtle. Consequently, in some cases, more than one alternative received a "Best" rating and in other cases, none of the alternatives received a "Best" rating. Likewise, when there were no discernable differences between alternatives each alternative received the same rating.

As discussed in previous technical memos, the approach used in the Tier I screening process involved measuring each alignment against each criteria individually. We have not summarized the conclusions into a single quantitative score to avoid assigning values to qualitative measures and prioritize the ranking of one criterion against another. Instead, the screening process shows the relative score of each alternative performed against the 13 criteria. Taking into consideration all of findings of the screening process, the highest performing alternatives were determined to be those received the most "Best" ratings.

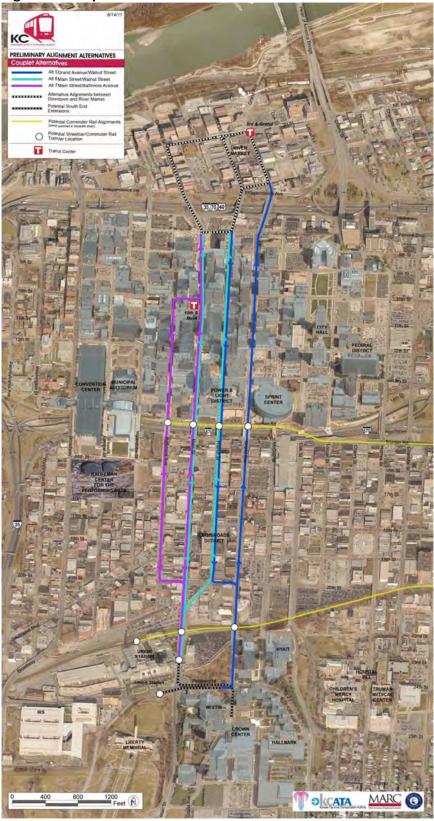
**Table 1: Tier 1 Screening Criteria** 

<b>Project Goal</b>	Screening Criteria
Connect	C1: Improve circulation within the Downtown Corridor; Improve transportation
	options
	C2: Improve connections between existing downtown activity centers
	C3: Improve pedestrian and bicycle environment
Develop	D1: Support development and redevelopment; provide catalyst for new
	development and redevelopment
	D2: Increase number of downtown residents
	D3: Support development of new activity centers
Thrive	T1: Support existing residential and employment centers
	T2: Support visitor and special event activities
	T3: Reflect public and stakeholder input
Sustain	S1A: Develop cost-effective transit solutions; improve effectiveness and
	efficiency of existing transit services
	S1B: Provide reliable transit services
	S2: Reduce the amount of surface space devoted to parking
	S3: Impact on utilities and their potential need for modification or relocation





Figure 2: Couplet Alternatives



# **Key Assumptions**

The evaluation process involved a number of assumptions. Among the most critical of these is determining the influence (or capture) area associated with each alignment. In general, the public transportation industry considers transit with walking distance of a destination if it is within ¼ mile of the route or service. As a result, a ¼ mile buffer was used to determine if an activity center is accessible to (or is served by) transit. This buffer was used as to determine access for criterion associated with population and employment (i.e. when people are walking to/from the alignments). For development impacts, however, the study team also based the influence area on the ¼ mile buffer but used a slightly broader interpretation of the rule (see below).

#### Walking Distances

For the bidirectional alternatives, setting a ¼ mile walking buffer is straight-forward. The study team drew a ¼ mile around the alignment and considered this area to be within walking distance of the alignment. For the couplet alternatives, however, only the area within a ¼ mile within both legs of the couplet was considered within the walking distance of the alignment. This assumption means that walking distance to and from the couplets is smaller as compared with the bidirectional alternatives. The reasoning behind this assumption is that both legs of the couplet must be within ¼ mile of the activity center to be considered within walking distance.

#### **Development Impacts**

For development impacts, as discussed, the study team also used the ¼ mile buffer but defined it slightly more broadly. Couplets operate on two parallel streets; instead of requiring both legs of the alignment to be within a ¼ buffer, we allowed the influence area to be ¼ of mile of each leg. As a result, the influence area is larger. This reflects assumptions that development potential is not absolutely tied to walking distance and being close to the alignment, even if it operates only in one direction, is sufficient to encourage development.

Note that no buffer was used at the northern end of the alignments, i.e. the area around City Market because the routing for any potential service has not yet been determined. On the southern end, the buffer is based on the end point of the alignment without any assumption made about a spur along Pershing Road.

# **Preliminary Findings: Tier 1 Screening**

The alternatives have different strengths and weaknesses and each option offers potential as a viable Downtown Corridor. The differences between the alternatives are those that offer more potential and better choices in terms of improving transportation linkages, supporting existing activity centers and strengthening development potential. The preliminary results of the Tier I screening process show that **Grand Boulevard and Main Street received the highest number of "Best" ratings** (see Table 2).

The strengths and weaknesses of each of the alternative alignments are summarized below, starting with Main Street and Grand Boulevard:

Grand Boulevard (Alternative 1) - Grand Boulevard was one of the two alternatives that
received a greater number of "Best" ratings. Two of the "Best" ratings are associated with
providing connections to downtown activity centers and access to employment and residential
areas. While several of the alternatives offered access to many of Downtown Kansas City's

primary activity centers (Sprint Center, Power and Light District, Crown Center, Union Station, Convention Center), Grand Boulevard is the only alternative that is accessible to/from the Government District. The Government District is a major employment center, thus the Grand Boulevard alternative is accessible to/from the largest number of jobs.

Grand also has fewer and less significant utility impacts, so it scored high in this criterion as well. Finally, there are several surface parking lots along Grand Boulevard, thus the alternative rated well in terms of offering potential to reduce the amount of surface parking.

As compared to the other alternatives, Grand Boulevard is less effective in supporting visitor and special event activities, due to its distance from the Convention Center and Kauffman Center for the Performing Arts Center. Ratings associated with transit service reliability were also low due to the high number of street closures and potential service conflicts associated with events at the Sprint Center.

Main Street (Alternative 2) - Main Street received five Best ratings. The Best ratings are
associated with several factors, including Main Street's strategic location in the center of
Downtown Kansas City, making it accessible to visitor and special event activities as well as most
of Downtown Kansas City's major activity centers. Main Street also rated well in terms of
improving circulation in downtown, because it is located adjacent to the 10th and Main Transit
Plaza, currently Kansas City's largest and most comfortable transfer locations. In addition, Main
Street also offers potential in terms of development and redevelopment impacts; the alignment
is a higher value corridor, thus new development also has potential to achieve high values.

Finally, Main Street is the alternative most preferred by members of the public and stakeholders. Public comment largely echoes other findings associated with Main Street being in the heart of Downtown Kansas City and equidistant from most major activities.

The only criterion that Main Street did not perform well on is the ability to reduce the amount of surface parking in Downtown. This rating reflects the fact that there are fewer surface parking lots along the corridor.

Walnut Street (Alternative 3) – Walnut Street generally performed well in the Tier 1 screening
criteria process, but lacked a compelling reason to keep the corridor under consideration. The
strengths of the corridor are that it is well positioned in Downtown Kansas City in terms of
access to existing employment, activity centers, and visitor attractions.

Walnut Street, however, is not a primary commercial corridor and consequently, tends to serve "back door" rather than primary access to some of Downtown's major buildings and attractions. In addition, because Walnut Street is not a primary commercial corridor, putting new transit services on Walnut Street would more likely dilute rather than strengthen the existing transit network. It also has less compelling potential development impacts with fewer vacant parcels and fewer larger sized parcels.

 Baltimore Avenue (Alternative 4) – Baltimore Avenue, like Walnut Street, performed well in the Tier 1 screening criteria process overall, but without exceptional performance in any of the criteria. Baltimore Avenue's strengths include a fairly strategic location in Kansas City with access to many of Downtown's activity centers, and visitor attractions. The corridor also offers a relatively better location to/from existing residential development and, consequently the best potential to encourage future residential development.

Some of the challenges associated with a Baltimore Avenue alignment are the distance and grade associated with travel to/from the Government District, Downtown's highest concentration of employment. Also, like Walnut Street, Baltimore Avenue is not a primary commercial corridor and tends to provide "back door" access to several of Downtown's main commercial centers. This also means that new transit services would more likely dilute rather than strengthen the existing transit network.

• **Grand Boulevard and Walnut Street (Alternative 5)** – The Grand Avenue/Walnut Street couplet alternative produced mixed results in the Tier 1 screening. Both streets are well positioned, such that the couplet provides access to Downtown employment and population, although less than the bidirectional option on Grand Boulevard. The Grand/Walnut couplet also ranked high in terms of potential to support development and reduce the amount of surface parking downtown. The high ranking largely reflects the couplet design which encompasses a larger area that could be positively influenced for development through improved transportation infrastructure.

Most of the challenges associated with the Grand Boulevard and Walnut Street alternative reflect challenges inherent to a couplet design. Operating service on two streets is a less intuitive service design (i.e. boarding on street and alighting on another). The impact of the service design would affect not only future corridor service, but also existing and future bus service. As a result, transit benefits are relatively more diluted as compared with the other alternatives. Couplets also have increased impacts on the utility system because they require construction and operations on two streets rather than one.

Main Street and Walnut Street (Alternative 6) – The Main and Walnut Street alternative
performed well in terms of access to/from Downtown's major activity centers as well as several
of the visitor and special event activities. Like the other couplets, the Main/Walnut alignment
also offers stronger potential to support development and redevelopment because it influences
a larger area. The couplet also has few issues with service reliability associated with street
closures.

Consistent with other couplet designs, the Main/Walnut couplet creates a less intuitive service design. However, the Main/Walnut couplet serves the 10<sup>th</sup> and Main Transit Plaza and thus would partially help strengthen the existing Downtown transit resources, although to a lesser extent than the bidirectional alignment on Main Street. Lastly, couplets have increased impacts on the utility system because they require construction and operations on two streets rather than one.

Main Street and Baltimore Avenue (Alternative 7) — The Main Street and Baltimore Avenue
couplet received a best rating for its ability to support development and redevelopment. This
best rating reflects a larger influence area that includes a fairly large number of vacant parcels
along the couplet corridors. The location of the couplet along Main Street and Baltimore Avenue

also means that the alignment is within walking distance of a large number of activity centers and visitor attractions.

Some of the challenges associated with the Main/Baltimore couplet are associated with the less intuitive service design and the relative impact on the Downtown transit network. As a result, as compared with other alternatives, especially the bidirectional ones, the Main/Baltimore couplet is less supportive of efficient and effective transportation options in Downtown. Also, as mentioned, couplet alignments had more utility impacts as compared with bidirectional options due to operations on two streets.

Other findings from the Tier 1 Screening process include:

- Overall, bi-directional alignments scored higher than the couplets. A critical exception to this
  rule is the ability of the alternative to support development and redevelopment. Because
  couplets operate on two streets, the alignments will influence a larger area in Downtown Kansas
  City and thus have a greater potential to support development. Only the Main Street alternative
  rated as strongly in terms of development and redevelopment potential.
- The couplets scored less well as compared to the bi-directional alternatives in several other screening criteria, namely:
  - O With service on two separate streets, couplets have less intuitive service design because riders would board and alight from the service in different locations. This service design also creates relatively confusing interfaces with bus services, especially with east-west connections operating on one-way streets. Consequently, the couplets are less effective at improving transportation options.
  - Walking distance to/from the couplet alternatives is smaller than some of the bidirectional options and thus these alignments were less accessible to/from Downtown Kansas City activity areas.
  - Because the couplets alternatives affect two streets, they have increased impacts on utility systems.
  - Finally, results from initial stakeholder meetings and a single public workshop suggest that the couplet alternatives are less attractive to stakeholders and members of the public.
- There is little difference between the alignments in terms of increasing the number of residents in Downtown Kansas City, thus none received a Best rating. This finding reflects the fact that Downtown Kansas City is currently heavily oriented toward employment, with jobs outnumbering residents 10 to 1. Downtown Corridor service could help support residential development; this criterion will be evaluated more closely in the Tier 2 evaluation.
- Initial screening of the alternatives included looking at the ability of the service to improve
  transit service to transit dependent populations (i.e., low income or zero vehicle household,
  individuals with a disability, individuals aged 65 or more or minority individuals). The analysis
  found that because the number of people living in the downtown corridor is small, the number
  of transit dependent individuals is likewise small. There is no difference between the
  alternatives, thus this screening criteria was not carried forward.



Results of the Tier 1 screening process are summarized in Table 2 and details on the individual criteria and each alignment are included as Tables $C1-S3$ and Figures $C1.1-S2.2$ .

Table 2. T	ier 1 scre	ening su	mmary m	atrix												
Alternative	C1. Downtown Circulation	C2. Activity Center Connections	C3. Bicycle & Pedestrian Connections	D1. Development & Re- development	D2. Downtown Residents	D3. New Catalyst Projects	T1. Residential & Employment Support	T2. Visitor & Special Events	T3. Public & Stakeholder Input	S1A. Transit Efficiency & Effectiveness	S1B. Reliable Service	S2. Surface Parking Reduction	S3. Utility Impacts	st	Good	air
<b>1</b> Grand	Good		Good	air	Good	Fair		Fair	od	Good	Fair		Best	4	5	4
2 Main	Best		Good	est	Good	Good		Best	est	Good	Good		Good	5	8	1
3 Walnut	Fair		Good	boc	Good	Fair		Good	od	Fair	Fair		Fair	0	8	5
4 Baltimore	Good		Fair	boc	Good	Good		Good	od	Fair	Good		Good	0	11	2
5 Grand Walnut	Fair		Good	est	Good	Good		Fair	hir	Fair	Fair		Fair	2	4	7
6 Main Walnut	Fair		Good	est	Good	Good		Good	hir	Fair	Fair		Fair	1	5	7
7 Main Baltimore	Fair		Fair	est	Good	Good		Good	hir	Fair	Good		Fair	1	6	6

Conclusions: Alternative 2 (Main Street) is the highest rated alignment after considering all objectives. It received the greatest number of "Best" ratings and a high number of "Good" ratings. This is mainly a result of Main Street's connections with downtown activity centers, special event venues, and transportation options, as well as its potential for development. Alternative 1 (Grand Boulevard) is second due to one fewer "Best" rating and a few more "Fair" ratings. Grand Boulevard has good connections to employment centers and other activity centers, and has the best pedestrian and bicycle environment, but it doesn't support visitor and special event activies as well as other alternatives. The reliability of transit service along Grand Boulevard also rates lower than other options. In general, the bidirectional alignments rate higher than the couplet ones, primariliy due to the smaller service area that reduces the number of transit and activity center connections. Service would also be less intuitive with the couplet alignments, and interactions with the local bus service would have to be carefully considered.

**Notes:** Walking distance analyses for the couplet alignments considers the area that can be reached by *both* the northbound and southbound trips, while development impact analyses for the couplets considers the area that can be reached by *either* the northbound or southbound trips.

Alternative	Serves 10th & Main Transit Center	Other Considerations	Fulfills Objective
<b>1</b> Grand	No (2 blocks away)	It may be desirable to move many existing bus routes from Grand Boulevard to Main Street to focus streetcar service on one major north-south arterial and bus service on the other (Main Street). This would provide very strong transit service on both primary Downtown Corridor arterials. The Grand Boulevard alignment would not directly connect with the 10th & Main Transit Center, which would be a more convenient and comfortable transfer location than locations along Grand Boulevard (since passengers could wait on-board KCATA buses that layover at 10th & Main).	Good
2 Main	Yes	It would likely be desirable to move Main Street MAX from Main Street to Grand Boulevard in order to provide premium transit service on both major north-south arterials. This would provide very strong transit service on both primary Downtown Corridor arterials. Also, this alignment would directly serve the 10th & Main Transit Center, which is currently the most attractive and comfortable transfer location in downtown.	Best
3 Walnut	No (1 block away)	Existing bus routes would likely stay focused on Main Street and Grand Boulevard, so this alignment creates three parallel north-south streets with strong transit service. This could dilute transit benefits.	Fair
4 Baltimore	Yes	Existing bus routes would likely stay focused on Main Street and Grand Boulevard, so this alignment creates three parallel north-south streets with strong transit service. This could dilute transit benefits. However, this alignment would directly serve the 10th & Main Transit Center, which is currently the most attractive and comfortable transfer location in downtown.	Good
<b>5</b> Grand Walnut	No (1 - 2 blocks away)	This alignment would produce a less intuitive overall transit service design with two-way bus service on Grand Boulevard but only one-way streetcar/enhanced bus service. Local bus connections would be on the same street in one direction but on another street in the opposite direction.	Fair
6 Main Walnut	Yes (only in one direction)	This alignment would produce a less intuitive overall transit service design with two-way bus service on Main Street but only one-way streetcar/enhanced bus service.	Fair
7 Main Baltimore	Yes (both directions)	This alignment would produce a less intuitive overall transit service design with two-way bus service on Main Street but only one-way streetcar/enhanced bus service. However, this alignment would directly serve the 10th & Main Transit Center, which is the most attractive and comfortable transfer location in downtown.	Fair

**Conclusions:** Bidirectional alignments would produce a more intuitive service design, especially in terms of interaction with local bus service. Couplet alignments could result in somewhat confusing interfaces with local bus service. Alignments that use Main Street and/or Baltimore Avenue would serve the 10th & Main Transit Center, which is currently a key downtown bus location. Overall, Alternative 2 (Main Street) would provde the best connections, followed by Alternatives 1 (Grand Boulevard) and 4 (Baltimore Avene), but effective connections could be provided with all alignments.

**Notes:** KCATA would likely reconfigure service in the Financial and Government Districts to make it simpler and more straightforward. This could be accomplished equally well with all alignments. This downtown service reconfiguration would allow all alignments to provide "last mile connectivity" equally well. Bus services could also be easily reconfigured in the Crown Center/Union Station area to provide effective connections to all alignments. Finally, all alignments would connect equally well with regional rail and transit services from Johnson County.

	Major Activity Centers Within 1/4	ections between existing downtown activity centers	
Alternative	Mile of Alignment	Summary	Fulfills Objective
<b>1</b> Grand	12	Close to the Sprint Center, Power & Light District, City Hall, Union Station, Crown Center, and many activity centers in the Government District. Does not directly serve the Convention Center or the Kaufmann Center for the Performing Arts. It would be farthest from activity centers to the west such as the Convention Center, but perceived distances could be shortened through the development of attractive pedestrian corridors.	Best
2 Main	11	Close to the Sprint Center, Power & Light District, Union Station, Crown Center, the Convention Center, and the Kaufmann Center for the Performing Arts. Does not directly serve the Government District. Main Street provides a large amount of physical space in which to implement Downtown Corridor service and streetscape improvements. Main Street also "splits the distance" between most major activity centers, and coupled with attractive pedestrian connections, could provide the best connections.	Best
3 Walnut	12	Includes much of the same area covered by the Grand Boulevard alignment, minus some of the Government District (e.g. the Bolling Federal Building, County Courthouse, and State Office Building). Directly serves the Convention Center and Kaufmann Center for the Performing Arts. Since Walnut Street is a secondary street, it would provide service more to the "back doors" of Grand Boulevard and Main Street activities, rather than direct front door service on one of these primary corridors. Also, KCATA services will remain focused on Grand Boulevard and/or Main Street, potentially creating less convenient interfaces with other transit services.	Good
4 Baltimore	11	Similar connections to activity centers as Main Street. Does not directly serve the Government District or some large office centers south of the Sprint Center. As with Walnut Street, service along Baltimore Avenue could be perceived as service to the "back door" of Grand Boulevard rather than high quality service through a primary corridor. Again similar to Walnut Street, KCATA services will remain focused on Grand Boulevard and/or Main Street, potentially creating less convenient interfaces with other transit services. Baltimore Avenue is also the farthest from the Government District, and walks between the two through the Main Street "valley" is perceived as difficult by some.	Good
5 Grand Walnut	10	Lowest number of activity centers served because the Government District is not directly served along with some areas west of Walnut Street. Would combine the pros and cons of the Grand Boulevard and Walnut Street bidirectional alignments. Also, with service split between two streets, connections with other services and boarding locations for reverse trips would be less intuitive.	Fair
6 Main Walnut	11	Similar activity center connections as Main Street. Would combine the pros and cons of the Grand Boulevard and Walnut Street bidirectional alignments. As with other couplet alignments, with service split between two streets, connections with other services and boarding locations for reverse trips would be less intuitive.	Fair
7 Main Baltimore	11	Similar activity center connections as Main Street. Would combine the pros and cons of the Grand Boulevard and Walnut Street bidirectional alignments. As with other couplet alignments, with service split between two streets, connections with other services and boarding locations for reverse trips would be less intuitive.	Fair

**Conclusions:** Alternatives 1 (Grand Boulevard) and 2 (Main Street) would provide the best opportunities for the development of high quality Downtown Corridor service with the most convenient connections to activity centers and other transit services. The alignments generally serve the Sprint Center, Power & Light District, Crown Center, and Union Station, but there is often a tradeoff between service to the Government District and the Convention Center/Kaufmann Center for the Performing Arts. Walnut Street bridges both areas somewhat but does not reach the entire Government District and the Convention area is on the western edge of its service area.

**Notes:** "Directly served" areas are those that are within a 1/4 mile buffer of each alignment. The analysis for the couplet alignments, however, only considers the area that can be reached by both the northbound and southbound trips. When overlaying service area buffers from the bidirectional alignments to discover the couplet service area, only the area of intersection is fully served by the couplets.

llternative	Primary Road Configuration	Pedestrian Environment	Bicycle Environment	Fulfills Objective
nd	2 traffic lanes in each direction (3 during peak periods)  Vehicle parking on both sides of street (off peak periods)  Sidewalks	Offers good pedestrian environment with wide streets and front door access to major activity centers. Traffic volumes are generally low, but speeds can be high	Only street currently designated as a Bike Route by Bike KC (from 12 <sup>th</sup> Street north through the River Market, and also south of Pershing). Parking may need to be modified to accommodate bikes. Bikes may also be accommodated on adjacent streets.	Good
in	2 traffic lanes in each direction Limited on-street parking Dedicated bus lanes along some segments Sidewalks	Major route for pedestrians with many activity centers and commercial activity. Generally good environment for pedestrians.	Limited on-street parking improves environment for bicyclists but bus only lanes (peak period) may create potential conflicts during peak periods and for some directions only. Bikes may also be accommodated on adjacent streets.	Good
) nut	Combination of one-way and two-way travel 4 travel lanes On-street parking and dedicated bus lanes in segments Sidewalks	Major route for pedestrians that traverses middle of the Power & Light entertainment district. The street has lower traffic volumes than Main Street and Grand Boulevard, which makes it a good street for pedestrians.	Has lower traffic volumes than other major street, but on street parking and bus only lanes creates potential conflicts for bicyclists. On-street parking may need to be modified to accommodate bikes. One-way northbound segment (north of 12th St) may also deter cyclists. Bikes may also be accommodated on adjacent streets.	Good
nore	One-way north of 12 <sup>th</sup> Street; two-way south of 12th On-street parking including angled parking south of 14 <sup>th</sup> Street Sidewalks	Pedestrian environment varies along corridor, with some segments more attractive than others, but has lowest traffic volume of four corridor alternatives.	Bicycle environment varies considerably due to one-way traffic patterns and angled parking. Improving bicycle environment would require changing angled parking, which is especially difficult for bicyclists. Bikes may also be accommodated on adjacent streets.	Fair
nd nut	See Grand and Walnut	Both Grand and Walnut have good pedestrian environments.	Grand is an attractive corridor for bicyclists. With some changes, Walnut offers adequate bicycle environment.	Good
in nut	See Main and Walnut	Main and Walnut have good pedestrian environments.	Both Main and Walnut offer adequate bicycle environment with some challenges associated with on-street parking and one-way traffic patterns.	Good
in nore	See Main and Baltimore	Both Main and Baltimore have good pedestrian environments.	Main offers offer adequate bicycle environment with some challenges.  Baltimore would require changes to angled parking to accommodate bicyclists.	Fair

Conclusion: All alignments offer good and comparable pedestrian environments. Alternative 1 (Grand Boulevard) offers the best environment for bicycle travel and would require the least amount of improvements to make the corridor more attractive. Alternative 2 (Main Street) and Alternative 3 (Walnut Street) offer some challenges associated with one-way traffic, peak period bus lanes, and on-street parking, but have a good environment. Alternative 4 (Baltimore Avenue) has additional challenges due to angled parking south of 14th Street. All couplets involve travel on one or more of the less desirable corridors (i.e. Main Street, Walnut Street, or Baltimore Avenue).

**Source:** Review of corridors from pedestrian and cyclists perspective.

Table D1: 9	Support deve	elopment an	d redevelop	ment; provi	de catalyst for new development and redevelopment	
		Within ¼ Mile	of Alignment			
Alternative	Vacant Parcels (Million Sq. Ft.)	Relative Value of Developed Parcels	Relative Value of Vacant Parcels	Relative Value of Potential Redevelopment	Summary	Fulfills Objective
1 Grand	2.74	0.99	1.01	0.92	Service area excludes a cluster of vacant parcels between Wyandotte and Central Streets, which have large potential for development (the prime reason for this alternative having the lowest potential). Includes a cluster between Oak and Locust Streets.	Fair
2 Main	2.96	1.02	1.00	1.01	Higher potential for redevelopment, largely due to the high value of developed parcels in this corridor.	Best
3 Walnut	2.93	1.00	1.00	0.97	Service area does not include a cluster of vacant parcels between Oak and Locust Streets, along with Central Street and Broadway Boulevard. The latter cluster of vacant parcels have high potential for redevelopment, leading to this alternative's smaller overall potential.	Good
4 Baltimore	3.02	1.02	1.04	1.01	Highest inventory of vacant parcels available for redevelopment among the bidirectional alternatives, though the value of developed parcels on the western side of the corridor is smaller.	Good
5 Grand Walnut	3.20	0.97	0.94	1.03	Couplet design involves more parcels for development due to the larger influence area.  Largest inventory of vacant parcels among all alternatives, which results in a high potential for redevelopment.	Best
6 Main Walnut	3.12	0.99	0.98	1.03	Couplet design involves more parcels for development due to the larger influence area.	Best
<b>7</b> Main Baltimore	3.10	1.01	1.03	1.03	Couplet design involves more parcels for development due to the larger influence area.  Lowest inventory of vacant parcels among the couplet alternatives, but high value of developed parcels in this service area results in a higher potential for redevelopment.	Best

Conclusions: Couplet alternatives have a larger influence area and therefore generally have a greater potential to spur redevelopment. Main Street also has a high potential largel due to the high value of the developed parcels in the corridor. Due to the geographic distribution and clustering of vacant parcels, the alternatives that serve more western areas generally have more vacant parcels available for development. However, a significant factor in determining an alternative's potential for redevelopment is the increase in value associated with development, so areas with the greatest difference in value between developed and vacant parcels will have high potential for redevelopment.

**Notes/Source:** This assumes vacant parcels that are redeveloped would increase in value to approximate the average developed parcel in the corridor. In reality, redeveloped parcels oftenappreciate even higher due to the added value of streetcar service (typically 15% or higher), though this additional appreciation is not included, which results in a conservative estimate of the redevelopment potential. "Vacant" parcels are those considered vacant (without a structure) in Jackson County's assessment GIS database and often includes parcels that would be considered underdeveloped, such as surface parking. Data is from Jackson County Assessor GIS database.

	Within ¼ Mile	of Alignment —						
ternative	Vacant Parcels (Million Sq. Ft.)	Population	Summary	Fulfills Objective				
	2.73	4,380	In general, the western side of the corridor is slightly more oriented toward residential uses than the east. Expansion of existing areas with a residential presence would be more likely than the development of entirely new residential areas. However, there are clusters of residential development between Grand Boulevard and Walnut Street in the Financial District, just south of the Power & Light District, and between 20th Street and 22nd Street. A Grand Boulevard alignment could spur additional residential development in those areas.	Good				
	2.70	4,970	Could serve most existing residential development, as well as new development in those areas, although less directly than Grand Boulevard or Walnut Street alignments.	Good				
	2.76	4,663	A Walnut Street alignment would serve many of the same residential clusters as the Grand Boulevard. However, since Grand Boulevard and Main Street are primarily commercial streets, and would remain so even with Downtown Corridor service on Walnut Street, a Walnut Street alignment could potentially become more residentially oriented than either Grand Boulevard or Main Street.	Good				
	2.81	4,893	Would provide the best service to Quality Hill (although much of the area would be beyond ¼ mile) and could make housing in this area more attractive and attract new residential development.  In a similar manner as Walnut Street, a Baltimore Avenue alignment could potentially become more residentially oriented than either Grand Boulevard or Main Street.	Good				
	2.50	4,380	Impacts would likely be a cross between those for Alignments 1 and 3.	Good				
	2.53	4,647	Impacts would likely be a cross between those for Alignments 2 and 3.	Good				
	2.68	4,893	Impacts would likely be a cross between those for Alignments 2 and 4.	Good				

Conclusions: Alternatives 2 (Main Street) and 4 (Baltimore Avenue) would likely be slightly more supportive of new residential growth, although the differences between all alignments would be small.

**Notes/Sources:** At the present time, the Downtown Corridor is heavily oriented toward employment, and jobs outnumber residents approximately 10 to 1. The largest cluster of residential development is in Quality Hill, much of which is more than ¼ mile from all alignments. Other clusters are all small. The map shows the block bounded by 10th & 11th Streets and Locust & Cherry Strees as vacant. However, this has since been developed into the JE Dunn Construction World Headquarters. The analysis for the couplet alignments only considers the area that can be reached by both the northbound and southbound trips. When overlaying service area buffers from the bidirectional alignments to discover the couplet service area, only the area of intersection is fully served by the couplets. Data from Jackson County Assessor GIS database and the 2007 KCMO travel demand model (adapted from MARC).

		Vithin ¼ Mile of Alignment			
Alternative	Acres of Vacant Parcels	Acres of Large Parcels (>1 acre)	Number of Large Parcels (>1 acre)	Summary	Fulfills Objective
1 Grand	61.5	18.6	24	Does not serve a cluster of large-sized parcels along Wyandotte Street from 6 <sup>th</sup> Street to 11 <sup>th</sup> Street; the only alignment to serve a cluster between 10th and 11th Streets west of Locust Street (East Village).	
2 Main	67.2	19.5	24	Serves large parcels between 9th and 10th Streets west of Central Street and parcels along Wyandotte Street north of 11th Street.	ı
3 Walnut	66.3	18.4	20	Same as Alternative 2 but does not include large parcels between 9th and 10th Streets west of Central Street.	
4 Baltimore	68.8	21.1	27	Serves a cluster of large-sized parcels between 8th and 6th Streets from Central Street to Baltimore Avenue; the only alternative to serve a cluster of parcels along Broadway Street just south of 12th Street.	i
5 Grand Walnut	72.5	20.1	27	Couplet design expands the influence on vacant parcels. Largest inventory of vacant parcels.	
6 Main Walnut	70.7	19.5	24	Couplet design expands the influence on vacant parcels. Does not serve a cluster of vacant parcels between 10th and 11th Streets west of Locust Street (East Village).	
7 Main Baltimore	70.4	21.1	27	Couplet design expands the influence on vacant parcels. Largest inventory of large parcels with the potential to become catalyst development projects.	1

**Conclusions:** The couplet alternatives have an expanded service area and therefore have the potential to influence more vacant parcels. All alternatives have a relatively similar potential to support development of new activity centers because each alternative serves a common set of large parcels between Wyandotte and Oak Streets. Depending on the alternative, one cluster of large parcels to the east (East Village) may be served and three clusters of large parcels to the west may be served. These four parcel clusters result in the minor differences between alternatives.

Notes/Source: The analysis for the couplet alignments considers the area that can be reached by either the northbound or the southbound legs. Land use GIS data from Jackson County.

-	Within ¼ Mi	le of Alignment	_	
Alternative	Population	Employees	Summary	Fulfills Objective
	4,380	51,551	Highest number of employees because it is close to the Sprint Center, Power & Light District, City Hall, Union Station, Crown Center, and many activity centers in the Government District. However, lowest population because there are very few residential areas along Grand Boulevard.	
	4,970	47,919	Close to the Sprint Center, Power & Light District, Union Station, most of Crown Center, the Convention Center, and the Kaufmann Center for the Performing Arts. The service area does not include the Government District, which mostly accounts for the lower employment numbers. Highest population due to the more residential character of the corridors west of Grand Boulevard.	
	4,663	49,905	Includes much of the same area covered by the Grand Boulevard alignment; however, some of the Government District is not within its service area (e.g. the Bolling Federal Building, County Courthouse, and State Office Building), thus accounting for the slightly smaller employment numbers. In addition, this alignment is closer to the Convention Center and Kaufmann Center for the Performing Arts, making up for some of the employment loss.	
	4,893	46,832	Similar connections to activity centers and population as Main Street but has the lowest number of employees of any bidirectional alignment. It does not include the Government District or some large office centers south of the Sprint Center.	
	4,380	48,403	The number of employees served is high but less than either Grand Boulevard or Walnut Street because parts of the Government District are not served nor some of the areas west of Walnut Street.	
	4,647	43,528	Combination of alignments along Main and Walnut Streets, but it does not directly serve the Government District. The overall character is more residential than Grand Boulevard.	
	4,893	46,516	Combination of alignments along Main Street and Baltimore Avenue. Does not directly serve the Government District and overall character is more residential than Grand Boulevard.	

**Conclusions:** There are no large differences in the number of residents and employees served (4,365 to 4,969 residents and 43,528 to 51,551 jobs). Grand Boulevard would serve the highest number of jobs because it provides the best service to the Government District.

**Notes/Source:** The analysis for the couplet alignments only considers the area that can be reached by both the northbound and southbound trips. When overlaying service area buffers from the bidirectional alignments to discover the couplet service area, only the area of intersection is fully served by the couplets. Data is from 2007 KCMO travel demand model (adapted from MARC).

	Within ¼ Mile of Alignment						
Alternative	Major Hotels	Hotel Beds	Special Event Venues	Number of Events	Attendance	Summary	Fulfills Objective
and	6	2,469	4	N/A	N/A	Close to the Sprint Center, Power & Light District, Union Station, and most of Crown Center. Has the lowest number of hotels and hotel beds because many area hotels are clustered around the Convention Center further west.	Fair
Ž ain	8	3,474	6	N/A	N/A	Close to the Sprint Center, Power & Light District, Union Station, most of Crown Center, the Convention Center, and the Kaufmann Center for the Performing Arts. Is accessible to most hotels and a large number of hotel beds.	Best
Inut	8	3,474	6	N/A	N/A	Includes much of the same area covered by the Grand Boulevard alignment. Also includes the Convention Center and Kaufmann Center for the Performing Arts, which accounts for the greater number of hotel beds. Is accessible to most hotels and a large number of hotel beds.	Good
1 more	8	3,474	6	N/A	N/A	This alignment has similar connections to activity centers as Main Street. Generally, no street closures currently along Baltimore Avenue. Is accessible to most hotels and a large number of hotel beds.	Good
5 and Inut	6	2,469	4	N/A	N/A	Similar access to hotels and special event venues as the Grand Boulevard alignment, minus the Convention Center and the Kaufmann Center. Is accessible to most hotels and a large number of hotel beds.	Fair
5 ain Inut	8	3,474	6	N/A	N/A	Similar to both the Main Street and Walnut Street alignments.	Good
7 ain more	8	3,474	6	N/A	N/A	Similar to both the Main Street and Baltimore Avenue alignments.	Good

**Conclusions:** All alignments serve hotels and special event venues well. However, alignments that utilize Grand Boulevard perform slightly worse because its service area does not include the Convention Center or the Kaufmann Center for the Performing Arts. Many major hotels are clustered around the Convention Center, which are not served by Grand Boulevard alignments.

**Notes/Sources:** The analysis for the couplet alignments only considers the area that can be reached by both the northbound and southbound trips. When overlaying service area buffers from the bidirectional alignments to discover the couplet service area, only the area of intersection is fully served by the couplets. Hotel information from 2007 KCMO travel demand model (adapted from MARC).

Table T3: In	corporate public and stakeholder input		
Alternative	Comments Expressing Support	Comment's Expressing Concern	Fulfills Objective
ALL	Support for alternative that serves River Market.	Concern over terminus at southern end of alignment, especially if service extends south of Pershing Road.	
	Wide street with direct routing through downtown. Adjacent to major activity centers such as Sprint Center. Traffic congestion is not a concern.	Connection to Union Station is not direct. Would be affected by street closures.	
	Street is straight and fairly wide, offers centralized line and logical choice through center of downtown. Equidistant to Convention Center, Power & Light and Sprint Center. Would be easy to extend service to the Plaza.	Traffic congestion may be problem at intersection with 11th Street. MAX already on Main Street.	
	Attractive street with flat profile. Offers connections to Power & Light and Crossroads and still close to Sprint Center. Good access to River Market.	Corridor is fairly narrow; may have difficulty accommodating additional transportation service. Also subjected to street closures.	
e	Offers connections to downtown residential areas and convention hotels.	Considered too far west. Corridor is fairly narrow. Bypasses many of the major activity centers, such as Power & Light and Crossroads.	
	Creates more street walking and street traffic to support economic development. Offers benefit to wider group of people	Issues reflect general concern over using couplets (i.e. higher costs, more difficult to understand, and diluting development potential).	
;	Less interference with events at Sprint Center and street closures. Offers direct connections to major activity centers.	Issues reflect general concern over using couplets (i.e. higher costs, more difficult to understand, and diluting development potential).	
e e	Equidistant from Spring Center and Performing Arts Center/Convention Center. Works around disruptions associated with Sprint Center events.	Issues reflect general concern over using couplets (i.e. higher costs, more difficult to understand, and diluting development potential).	

**Conclusions:** All alternatives had supporters. Main Street received the strongest and most consistent stakeholder and community support, largely due to its central location and access to activity centers. Grand Boulevard had strong support but also received more negative comments as compared to Main Street. Couplet alternatives were generally less well perceived, primarily due to concerns over service design rather than alignment.

Notes/Source: Comments represent public and stakeholder opinion. Data drawn from stakeholder interviews and public comment received at June 21, 2011 Public Open House.

Table S1A: Develop cost-effective transit solutions; improve effectiveness and efficiency of existing transit service						
Alternative	Summary	Fulfills Objective				
	Most bus service between Crown Center and the Financial District now operates on Grand Boulevard. With Downtown Corridor service, most or all bus service could be shifted to Main Street where it could share existing MAX facilities (bus lanes and stations). Alternatively, Grand Boulevard could be developed as the corridor's primary transit street, with both streetcar/enhanced bus and most or all local bus service. Synergies between the Downtown Corridor and Grand Boulevard Streetscape projects could reduce costs. In either case, transit facility improvements would be focused on Grand Boulevard and few, if any, infrastructure improvements would be made on other streets.					
	With Downtown Corridor service on Main Street, it would likely be desirable to shift Main Street MAX service to Grand Boulevard. Bus facility improvements (bus lanes, stops/stations, etc.) could be implemented on Grand Boulevard as part of the Grand Boulevard Streetscape project. In this case, significant transit service improvements would be implemented on both Main Street and Grand Boulevard. The development of streetcar service on Main Street and the shifting of Main Street MAX would provide strong transit spines on each of the corridor's two major north-south streets.					
	There would be few compelling reasons to shift existing north-south bus services from either Main Street or Grand Boulevard to Walnut Street as it would likely be slower and a block away from higher activity centers. Thus, there would be fewer potential synergies between Downtown Corridor and local bus service.					
	With Downtown Corridor service on Baltimore Avenue, it is likely that Main Street MAX service would remain on Main Street, as Main Street provides for faster service, which is a key element of MAX service. As a result, the corridor's two premium services would be located only one block apart. Therefore, they would compete with each other, perhaps more than they would complement each other. It would also mean that the two premium north-south services would be focused on the western side of the corridor, which would provide less service coverage than other Downtown Corridor/Main Street MAX combinations.					
	Similar to Alternative 1 (Grand Boulevard), except that Grand Boulevard would become a transit spine to a lesser extent than with Alternative 1 because streetcar service would be split between Grand Boulevard and Walnut Street.					
	Similar to Alternative 2 (Main Street), except that Main Street would become a transit spine to a lesser extent than with Alternative 2 because streetcar service would be split between Main Street and Walnut Street.					
	Similar to Alternative 2 (Main Street), except that Main Street would become a transit spine to a lesser extent than with Alternative 2 because streetcar service would be split between Main Street and Baltimore Avenue.					

Conclusions: Alternative 1 (Grand Boulevard) provides the best potential for efficient downtown transit service as it (1) offers the opportunity to develop strong transit spines on both of the Downtown Corridor's major north-south arterials (Main Street and Grand Boulevard) and (2) creates possible synergies with the Grand Boulevard Streetscape project. However, it would not provide direct connections at the 10th & Main Transit Center. Alternative 2 (Main Street) provides the second best potential for the strengthening of the overall downtown transit system as it (1) offers the opportunity to develop strong transit spines on both of the Downtown Corridor's major north-south arterials (Main Street and Grand Boulevard) and (2) would provide direct connections at the 10th & Main Transit Center.

**Notes:** KCATA, as part of its CSA efforts, desires to rationalize bus circulation to, from, and through the Financial and Government Districts and plans to orient the reconfiguration around the selected Downtown Corridor alignments. All alignments would provide for the development of a more efficient reconfiguration of Financial and Government District bus service. All alignments could also provide for the conversion of some bus service that operate through the corridor (originating from the north or south) to terminate at the ends of the Downtown Corridor service, with continuing service then provided by the streetcar/enhanced bus.

Alternative	Annual Partial Day Street Closures	Annual Full Day Street Closures	Summary	Fulfills Objective
1 Grand	5	16	There are a significant number of street closings on Grand Boulevard in front of the Sprint Center that are associated with Sprint Center events. These include partial day closures to help control pedestrian circulation to large events where the street is shut down during the event and for a short duration before and after, and full day closures that can last for several days at a time. (For the six month periods between March and August 2011, there were 5 partial days closures and 16 days of full day closures). During these times, if streetcar service were to operate through the street closure section, there would almost certainly be delays, although these delays could likely be managed. Enhanced bus service would detour around the street closures, which would add a few minutes to running times.	Fair
2 Main	0	0	Through the Financial District, Main Street has two travel lanes in each direction. South of 10th Street, parking is prohibited, but north of 10th Street, it is permitted during off-peak periods. This creates a minor choke point in this area. If on-street parking were maintained, there could be some minor delays.	Good
3 Walnut	7	0	South of the loop, Walnut Street is one-way northbound with two lanes of traffic and parking on both sides. With two-way Downtown Corridor service, either the left-most lane would need to be converted to a southbound transit lane, or alternatively, the street could be converted to two-way operation. In any event, traffic volumes are light, and reliable operation could be expected. Within the loop, Walnut Street has three to four travel lanes, and with the exception of a two block section between Truman Road and 12 <sup>th</sup> Street, is also one-way northbound. However, using similar measures as described for south of the loop, reliable service could be provided. Walnut Street has 7 partial day street closures due to events at the Power & Light District. During these times, if streetcar service were to operate through the street closure section, there would almost certainly be delays, although these delays could likely be managed. Enhanced bus service would detour around the street closures, which would add a few minutes to running times.	Fair
4 Baltimore	1	0	South of 12 <sup>th</sup> Street, Baltimore Avenue is two-way with one lane of traffic in each direction and parking on both sides (some of which is back-in angle parking). Traffic volumes are light, and reliable operation could be expected. North of 12 <sup>th</sup> Street, Walnut Street is one-way with two northbound travel lanes and parking on each side. With Downtown Corridor service, either the left-most lane would need to be converted to a southbound transit lane, or alternatively, the street could be converted to two-way operation. In any event, reliable operation could be expected.	Good
5 Grand Walnut	12	16	With Grand Boulevard/Walnut Street service, it would be desirable for northbound service to operate on Grand Boulevard and southbound service to operate on Walnut Street (since Americans are used to right-hand side operations). This would require at least one lane of much of Walnut Street to be converted to southbound operation, and reliable service could be provided throughout the corridor.	Fair
6 Main Walnut	7	0	With Main Street/Walnut Street service, northbound service would most likely operate on Walnut Street and southbound service on Main Street. Service could be operated reliably on both streets.	Fair
7 Main Baltimore	1	0	With Main Street/Baltimore Avenue service, it would be desirable for northbound service to operate on Main Street and southbound service on Baltimore Avenue. This would require at least one lane on Baltimore Avenue between 10th Street and 12th Street to be converted to southbound operation, and reliable service could be provided throughout the corridor.	Good

**Conclusions:** On a day-to-day basis, all alignments would provide for reliable service. The most significant exception would be Grand Boulevard, where there would be conflicts between Downtown Corridor service and Sprint Center special events, and which would likely produce delays during those times.

Notes/Source: There are a number of special events at Crown Center during which Grand Boulevard is closed south of Pershing Road. As long as Downtown Corridor service does not extend south of Pershing Road, none of these events would impact Downtown Corridor service to a significant extent. Data is from Kansas City Convention & Visitors Association for 2011.

Alternative	Acres of Surface Parking Within ¼ Mile	Summary	Fulfills Objective
1 Grand	95.6	Includes free surface lots between Cherry/Locust and 10th/11th. However, this has since been developed into the JE Dunn Construction World Headquarters. Highest amount of surface parking among the bidirectional alternatives.	Best
2 Main	86.1	Access to some free surface lots that Grand Boulevard and Walnut Street alignments do not have. Parcels seem large enough for development potential.	Fair
3 Walnut	89.1	Does not provide any particular benefit in terms of access to surface parking. Lowest acreage of surface parking among all alternatives.	Good
4 Baltimore	88.6	Includes several smaller free surface lots towards southern end of the alignment but most seem too small for substantial development potential. Lacks access to large paid lot that other alignments have (on Locust between 19th and 20th).	Good
5 Grand Walnut	103.1	Couplet alignment expands the influence of the alignment to a greater area, capturing the surface lots in both the Grand and Walnut bidirectional alternatives. Highest acreage of surface parking among all alternatives.	Best
6 Main Walnut	94.8	Couplet alignment expands the influence of the alignment to a greater area, capturing the surface lots in both the Main and Walnut bidirectional alternatives.	Good
7 Main Baltimore	89.8	Couplet alignment expands the influence of the alignment to a greater area, capturing the surface lots in both the Main and Baltimore bidirectional alternatives.	Good

**Conclusions:** The couplet alignments have greater potential to convert surface parking to higher uses than their component streets individually due to a larger influence area. There is a greater concentration of surface parking in the eastern areas, which give alternatives utilizing Walnut and Grand greater potential for redevelopment. Alternative 1 (Grand) and Alternative 5 (Grand and Walnut) provide the greatest potential to convert surface parking into higher value uses.

Notes/Source: Square footage of garage parking was excluded from the calculation of surface parking. Data from Jackson County Assessor GIS database.

Table S3: Im	Table S3: Impact on utilities and their potential need for modification or relocation  Ranking ————————————————————————————————————							
Alternative	AT&T	Verizon/MCI	Utility Score	Summary	Fulfills Objective			
<b>1</b> Grand	1 <sup>st</sup>	2 <sup>nd</sup>	360	Least amount of utility impacts of all alignments because there are few storm sewer, communication line, and steam/chilled water impacts.				
2 Main	2 <sup>nd</sup>	$4^{\rm th}$	391	Least amount of water, sanitary sewer, and gas utility impacts but a very high impact on communication lines. A large duct line containing numerous communication lines for multiple companies exists along Main Street.				
3 Walnut	3 <sup>rd</sup>	3 <sup>rd</sup>	419	Highest amount of utility impacts of all bidirectional alignments because of high impacts on sanitary sewer, storm sewer, combined sanitary and storm sewer, and gas utilities. However, small impact on electric lines.	_			
4 Baltimore	3 <sup>rd</sup>	1 <sup>st</sup>	417	High impacts on water, sanitary sewer, and steam/chilled water utilities. Least impact on combined sanitary and sewer utilities.				
<b>5</b> Grand Walnut	-	-	779	Combination of Alternatives 1 and 3. Moderate impact among the couplet alignments.				
<b>6</b> Main Walnut	-	-	810	Combination of Alternatives 2 and 3. Highest utility impact among all alignments.				
7 Main Baltimore	-	-	719	Similar to Alternatives 2 and 4, although not a simple addition of the two alignments. Lowest impact of all coulet alignments.				

Conclusions: Alternative 1 (Grand Boulevard) has the least amount of utility impacts, while Alternative 2 (Main Street) is the second best. Walnut Street will have the highest number of utilities requiring potential modification or relocation, although Baltimore will have a similar number. The couplet alignments with have the highest impact on utilities because the streetcar/enhanced bus will operate on two

Notes/Source: AT&T and Verizon/MCI did not provide documentation of the location of their utility lines, instead providing rankings of their preferred alignments. They did not rank the couplet alignments, primarily focusing on the impacts along individual streets. The size and location of each utility located along an alignment was considered when scoring. The utilities examined include water, sanitary sewer, storm sewer, combinded sanitary and storm sewer, gas, steam/chilled water, electric, and communications. Overall, lower scores correspond to lower impacts due to a smaller amount, smaller lines (pipes), and/or a better location.





# **Public Open House**

Tuesday, August 23, 2011 from 8 a.m. to 6:30 p.m. CST
Union Station's Grand Hall
30 W. Pershing Road
Kansas City, Mo. 64105

A public open house was held to discuss the Downtown Corridor Alternatives Analysis (AA) on August 23, 2011 from 8 a.m. to 6:30 p.m. in the Grand Hall of Union Station (30 W. Pershing Road) in Kansas City, Mo. No formal presentations were given. The Regional Transit Alliance (RTA) hosted a Streetcar Party from 7 a.m. to 7 p.m. at Union Station on the same day to give the public a "sneak peak" at the type of streetcar and bus alternatives currently under consideration through the Downtown Corridor AA.

The purpose of the open house was to provide targeted stakeholder groups and the general public and media with an overview of the Downtown Corridor AA as well as to:

- Share information about the:
  - o Purpose and need for the AA.
  - How the AA differs from other efforts.
  - o Planning process and schedule for the AA.
  - Differences between transit modes, such as the modern street car and circulator bus.
  - Tier 1 evaluation of alignment alternatives for a potential, fixed-guideway starter line.
  - Tier 2 evaluation of the Grand Boulevard and Main Street alignment alternatives.
  - Development of a Locally Preferred Alternative (LPA) and general financing strategies for it.
- Gather feedback on:
  - Tier 2 evaluation factors that should be considered.
  - General comments.

Approximately 900 people participated in the Streetcar Party including the nearly 280 who signed in to attend the open house, 300 who toured the Kinkisharyo ameriTRAM, 160 RTA raffle participants, and 150 registrants for Quixotic Fusion's transportation inspired musical performance. Attendees included local public officials and staff, downtown residents, business representatives, neighborhood groups, umbrella agencies, advocacy groups, and media. Notice was provided via press releases, <a href="https://www.smartmoves.org">www.smartmoves.org</a>, email blasts, Facebook,





and stakeholder meeting announcements. An overview of the information presented at the meeting, general comments, comment card responses, and other comments are included below.

## **Handouts and Exhibits**

Handouts provided to meeting participants included:

- Meeting overview handout
- Project comment form
- Meeting evaluation form

Meeting participants were encouraged to review the following exhibits:

- **Welcome:** Relevant meeting information
- **Overview:** Project description
- Process and Schedule: General project details
- Project Purpose and Need: Purpose and need statement
- Modes of Transit: Circulator bus and modern streetcar comparison
- June Alignment Alternatives: Maps of the seven alternatives
- **Tier 1 Evaluation:** Evaluation criteria and results of the process to narrow the seven alignment alternatives to two
- August Alignment Alternatives: Grand Boulevard and Main Street
- How to Pay for It: Guiding principles and potential sources of funding
- **Next Steps:** Project schedule
- Stay Informed: www.smartmoves.org

# **General Summary of Comments**

Forty-five (45) hardcopy project comment cards and 24 meeting evaluation forms were returned to the project team during the weeks that followed the open house. Generally, the feedback received related to:

#### Factors that should be considered during Tier 2 evaluation

- Potential for starter line expansion to:
  - Country Club Plaza
  - 18<sup>th</sup> and Vine
  - Waldo area
  - North of the river, e.g. KCl Airport
  - Johnson County
  - East





- o Simplicity of alignment, e.g. straight as possible, especially at the ends
- Ability of working population to access the starter line for work, food/grocery, and other transit connections, e.g. Main Street MAX, potential Main Street light rail
  - Streetcar operational factors may impact the MAX
- Ridership generated from working populations
  - Begin starter line farther out (in multiple directions) and where other transit connections can be made
- Bicycle accommodations:
  - Bikes on streetcars via "bike zone"
  - Possibility of bringing bikes on streetcars
  - Bike racks at stops and on cars
  - Impacts of streetcar on bike lanes
- o Interior streetcar design:
  - Materials used for and position of seats
  - Amount of seating
  - Opportunity for bike zone
- New development opportunities within the streetcar corridor and beyond, e.g.
   Berkley Riverfront Park
- o Energy efficiency, e.g. air quality and carbon dioxide impacts
- Emergency procedures
- Ease of construction
- ADA requirements
- o Park-and-ride potential
- Advertising ability
- o Tourism

# Funding

- o How much will the project cost?
- What are the funding sources, e.g. federal, state, or county (Jackson and/or Johnson County), residents and businesses?
- o To whom will assessments be applied?
- o What benefit will assessed properties receive?





- o Will incentives be offered to businesses?
- **Grand Boulevard alignment** impacts Sprint Center but also:
  - Serves all of the centers
  - Connects jobs
  - Relates to the Making Grand Boulevard Grand project
  - Is straighter
- Main Street alignment impacts Main Street MAX bus but also:
  - Connects to grocery, entertainment, residential, and work locations
  - Is central to downtown
  - Has parking impacts

### Logistics

- Where and how to pay for tickets
- Hours of operations, e.g. late night hours, given likely riders (workers, tourists) and their ages and income ranges
- Trip length Avoid alignments and stop selections that create longer trips
- City Market connections and alignments

#### Other

- Like light rail from Waldo to the KCI Airport
- o Coordinating and informing the rental population about the project

### **Verbatim Comments from Comment Cards**

The comment forms provided to meeting participants during the meeting and included the two questions below and resulted in the answers included with each.

- Through September 2011 the study team will conduct a Tier 2 evaluation of the alignment and mode alternatives on display today. Tier 1 evaluation factors are included with the detailed Tier 2 analysis. Such factors include stakeholder input, potential ridership, construction and operating costs, economic development potential, traffic and land use impacts, right-of-way issues, community issues, and impacts to environmental and historic resources. What other evaluation factors should the team consider? Why?
  - Potential future expansion of the streetcar to the Plaza, 18<sup>th</sup> and Vine, and beyond when considering choice of Main Street and Grand. Perception of a





- streetcar over a MAX bus to tourists and conventioneers. More recognizable and pleasant appearance.
- o Simplicity of alignment It is important to me that the alignment be as straight as possible and that it takes into consideration future expansion of the lines. I believe this has been done everywhere but at the south end. It is unnecessary to turn the alignment and go one full block, just to stop right in from of an "attraction". It is much simpler and more cost effective to stop the line without turning the corner. People are able to walk the one block to Crown Center or the Union Station; plus we already have the skywalk. These unnecessary turns slow travel time north to south and prevent commuters from using the mass transit. I am concerned about this because I live 3 blocks from the Main Street MAX bus.
- Job access/food access/transit access for urban core residents particularly those who likely do not have personal transportation. The commuter lines that would run east/west would help, granted they make frequent enough stops.
- Realistic plans for traditional light rail should be taken into consideration. Such plans often have light rail on Main south of the downtown loop. If modern streetcar is built on the same alignment it could become an obstacle to light rail unless the track is built to traditional light rail standards.
- My interest is in this route serving the stadiums to the Power and Light District before we look at River Market to Crown Center as the MAX serves that market today.
- Open house focus is only on the downtown loop which, when judged on its own, implies a convenient mid-town trip for those already downtown. I'd like to see how this plays with the MAX, the Jo, and the current or planned routes.
- The sooner the better we need a good mass transit in the Kansas City Metro area. I feel it should serve all of Kansas City not just Kansas City, Mo. The cost should be absorbed by all the resident whether it be in from of sales tax in all communities it serves.
- o I think one consideration should be how many people might be riding the streetcar or rapid bus option to their job. For me at times it can be difficult getting to work because ATA bus service ends about midnight. I believe that the hours of operation of a streetcar line or expanded bus/bus rapid transit should be carefully looked at. I work the 12:00 AM to 8:00 AM shift and depend on the bus right now to get me there. I work downtown. I know there are not as many people working at night or overnight as during the day. But there is a few of us who do.
- Expansion capability.
- Is the downtown corridor the wisest place to begin improving transit? Will the proposed streetcar services give us the greatest impact per dollar in reducing





transportation carbon dioxide emissions and oil use? Are streetcars sufficiently more appealing than MAX bus service such that ridership will increase enough to justify the investment? Are streetcars significantly more energy efficient than MAX buses? How much would a downtown corridor streetcar system improve air quality over MAX buses?

- Consider the use of daily life for citizens who live in the urban core. Main seems to be a more viable option for residents with connection to grocery, entertainment, residential and work space. As a downtown residents for almost 5 years – it is incredible to finally have this discussion in great detail.
- Route I would vote for the Main Street route at this point, mostly because it is more centrally located than Grand. I would prefer that you extend it all the way to Waldo...some day...
- Cars Add more hand rails for standing passengers. Create a "bike zone" in part of the car for biking passengers. Also, consider a smooth plastic or vinyl seat rather than fabric. Fabric can conceal wetness, gum, dirt, etc and nobody needs that.
- We need a dedicated right-of-way as much as possible for the streetcar to get the train to move fast and efficiently. Electricity's the best option for power.
   We need an expandable system to reach the suburbs later \_\_\_\_ using standard gauge.
- I'm in favor of the whole project. Would love to have the streetcars, probably on Main would be my choice. Wish we could have the light rail all the way from Waldo to the airport – think it would be a big plus for the city. Really like the streetcar itself.
- It will help ecology, the traffic and save time for many in many ways. Full speed ahead!!
- I like the concept of Tier 1 findings. Please start ASAP to get this city moving towards an up-to-date transit system.
- Connecting important city parts, ease of construction, development opportunities – new development as opposed to developing what is already reasonably . Grand is way better route than Main!
- The route should be Grand Avenue! It goes to the right places, serves all of the centers, and has the proper worth.
- Also consider operational impacts the proposed alignment would have on both the streetcar and any realigned bus/BRT routes.
- The defects of this streetcar.
- Owhat to do in case of emergency?
- o How much does this cost and how will it affect tax payers?





- Is this streetcar really necessary with respect to all of the other transportation involved?
- I would just like to voice my support for two concepts: 1) The Main corridor alignment is the best. Please select that plan. 2) Please take effort to decouple the movement to build downtown streetcar from the regional commuter rail. They are fundamentally different projects. The streetcar is locally funded, bottom up development whereas the commuter rail, regional system will require massive state and federal subsidy. Although I want both efforts to succeed, one is not and should not be dependent on the other. Please be sure to separate the two so that failure of the regional system will not prevent development of the streetcar system.
- Consider All crucial to be successful: handicapped access, ticket enforcements, security/safety, affordability, seasonal changes = traffic/weather, preferred all day access, cheaper on M-TH thru F-SU, safety to pedestrians. All make experience easy and worry free to all users: citizens of city, tourist, low income, older, handicap – too expensive nobody will ride.
- o I still choose Grand Boulevard.
- ADA compliancy.
- o Sprint Center management could be a source of problems on Grand.
- I would favor routes where development potential is greater Illustrate how transit can create improved property vitalization/values/tax base.
- I would encourage the team to consider development parcels on the river (by Berkley Park) as part of the study area, and a potential route for the streetcar to connect the MO River with the rest of downtown. This could be considered regardless of a Main or Grand route.
- Park and ride potential to downtown employees.
- My name is \_\_\_\_\_ and I am really for the city getting a streetcar or light rail. I currently live here and was born and raised here in KCMO. After going to college in Chicago and living in St. Louis for awhile I think we are behind the 8 ball and our city stinks since we have bad public transportation and one way to make KCMO a great city like Chicago or St. Louis is to bring a better transit system like streetcar or light rail then that way more jobs will come here, more people will move to the city and more entertainment will come here a lot more often.
- What impact will the streetcar have on bike lanes along the routes?
- How can bikes (and riders) be accommodated on the streetcar? Is it possible to bring the bike onto the streetcar?





- People who rent apartments along the route are also likely users and supporters. How are they being included in the discussion?
- Use streetcar, not another bus.
- How to incorporate bike riders into the streetcar use. Will there be bike racks at street stop locations and/or will there be ways to transport bikes on the streetcars themselves?
- o How are you notifying the renters in the community since they are likely users?
- What impact will streetcar have on street thinking of adding bike lanes? Will bike riders be able to take a bike on the streetcar?
- Just do it!
- Since Sept. 2009 I been disabled. My right side does not work right. Talking with these folks it sounds good for disabled people.
- Wheelchair bus Level floor \_\_\_\_ with level platform are fast and preferred.
- o Tickets to be bought on platform, not cars would be better.
- For airport expansion, does any alignment get to a bridge (Broadway, \_\_\_\_\_, ASB) or that can be used to cross the river?
- Critical to consider connecting with other modes. This should improve ridership and make seamless travel possible without a car.
- The idea of public transportation in the form of light rail is an exciting one. However, the proposed idea of the starter line starting at Union Station and running to the River Market is short sighted. I agree that the starter line has to start somewhere. I would like it to encompass the areas that working people come from. In other words it should go east, west and south but at a point that connects with buses.
- What about advertising?
- I like the Main Street concept.
- o How will we build tracks for light rail? Is light rail where we're heading?
- How long will it take to complete???
- O What areas of the city will have access?
- o How is trackage done? Middle of the street, or to the side?
- O How many and how often will it stop to take on or discharge passengers?
- o How will the turnaround work at each end?
- What other comments or questions do you have?





- Love the <u>streetcar</u>! This is long overdue in KC! It is great for residents in downtown, but also an enhancement for tourism and conventions. It is a "must have" for a city our size.
- o Rapid Transit Lines. However I cannot justify using the bus due to its departures from the main thoroughfares. These departures cause the trip to take about 35 minutes by bus from 59<sup>th</sup> and Brookside Blvd to 13<sup>th</sup> and Wyandotte. This same 'community trip' takes me 12 minutes by car. I know of myself and several neighbors who do not ride for this reason. I wrote this because I am pro streetcar and do not want commuter ridership to decrease because travel time went up just so the station was at a location's front door instead of one block away. Thank you for your earnest consideration of all comment.
- Having the line <u>enter</u> the City Market seems like an inefficient model, especially for those of us who live and shop in the River Market area.
- Forget about running commuter rail on Truman Road. The idea is ridiculous.
  There is no track there and demolishing Truman Road to put one in makes no
  sense and likely would be prohibitively expensive. It would be better to send
  commuter rail to Union Station and then implement an efficient and
  convenient connection to downtown.
- I am in favor of this. I feel it would help some of the bus/Metro overcrowding especially rush hour. I also think it will be good for our economy.
- Get moving! Let's build something that makes sense for providing KC options for transportation.
- o If we're going to make a major investment in transit, it needs to get people out of their cars who would otherwise drive, and not just a few people. It's not enough to give those who already use transit a better transit mode. Much higher oil prices are in the foreseeable future, and the climate crisis is upon us.
- It about long overdue. It would be \_\_\_\_\_ into KCMO. I love it from living 25 years in San Francisco/Oakland, CA.
- Grand terminating in Crown Center is \_\_\_\_ more \_\_\_ terminus for the streetcar.
- Consider both how the proposed route serves existing users and destinations, but also how will it would serve future, built-out/redeveloped areas. What is the best route for tomorrow and today?
- o I will support either alignment if it means getting something built.
- o How sufficient will this be for every individual to afford this new endeavor?
- How is the streetcar being paid for?





- Great presentation: Maybe tax payers pay as little as possible. Don't rely on fed aid unless it's guaranteed. Priority No. 1 continue mass transit drive after completed.
- o If Main Street is chosen will Main Street MAX be put on Grand Boulevard?
- o Will you take away parking from Main Street downtown?
- Will this cost too much?
- o Will the developers and city officials use the system?
- o Will this last 30 years or more?
- Are there plans to extend south past 75<sup>th</sup> Street?
- o Will this run in the evening?
- I would favor the Grand Avenue route because it would be a better connector to and from jobs, and the projected Grand Avenue redevelopment could be tied in with the streetcar.
- I think this is a very well thought out plan and I fully support it. I only hope that this includes plans for further expansion throughout the city. KC is so far behind other cities of comparable size. I say let's get this done.
- What is your long term funding for this project? Will it be state, federal, or just Jackson County? Would it be a joint venture with Johnson?
- Good to see real transit solutions come to downtown. PLEASE make this happen!
- I prefer the Grand Boulevard alignment. It's straighter and more right-of-way is available.
- o Main route is preferable due to closures of Grand at 14<sup>th</sup> for events (Big 12 tourn, etc), proximity to hotels, convention center and city tourists. What is the plan to address the Main Street line at 5<sup>th</sup> Street near the city market? Weekends make any vehicular traffic along that street near impossible. Would a turn down Independence make more sense? Walk to 5<sup>th</sup> and Walnut on a Saturday to see example.
- The Main Street route seems more centralized between the convention district and entertainment district and is in better proximity to the hotels. I think this is the best option!
- I would question how to deal with City Market traffic, especially on Saturdays and along 5<sup>th</sup> Street. Would it be possible to look at 3<sup>rd</sup> and/or Delaware routes?
- I have concerns with the Grand option because of proximity to convention center and hotels and having to deal with the frequent closing of Grand due to Sprint Center activities.





- O I prefer a modern streetcar option. I prefer the route on Main Street. I feel it is more central and would provide good access to both residents and tourists. I think a Main Street route could be easier to expand. Careful consideration should be given to the routing through the river market. Could the south bound route in the River Market go on 3<sup>rd</sup> and down Delaware?
- o Is it possible to offer incentives for affecting businesses during construction?
- Spend the money for the working people on the Plaza, downtown, and out south (perhaps Ward Parkway or Red Bridge and also 119<sup>th</sup> in Johnson County).
   Start with considering working people.
- I like Main/Grand Don't see it as confusing.
- o What about public comments and survey?
- Love the modern streetcar!
- o The MAX hybrid was awesome.
- Excited about light rail!
- I live in the corridor proposed and I am opposed to a special assessment unless we get some other benefit.

# **Comments from Evaluation Forms**

Specific project-related comments included on the meeting evaluation forms are listed below.

- Consideration should be given to potential expansion to the airport (via commuter or light rail).
- More advertising to let people know it's here. Invite other companies to show their streetcars. Future bidders – So we can check them out.
- Main Street alignment preferred.
- The trolley car system is great! The battery powered streetcar would be fantastic alternative to power lines.
- I like Main over Grand. I support streetcar over bus.
- Need to straighten out MAX.
- Need more seating on streetcar/longer car. Seating should face forward.
- Bring in an articulated bus (higher capacity) for comparison.
- Need off-board far collection.
- This will function as "just" a circulator at first but the line needs to be designed with expansion (at least to Plaza/UMKC) in mind.





- Love the idea of a streetcar type system. Dislike leaving out midtown residents/plaza. Based on the current route(s) I would rarely take the streetcar. I don't frequent P & L or River Market and would have to go 2 miles to get \_\_\_\_ first car. I might as well drive. Lots of midtowners probably agree.
- Would like to also be involved in discussions re: way to connect the downtown corridor with other areas of the city.
- This is something that KC needs. We vote for light rail and nothing has been done. I
  would ride if it was available.
- I still think it should be a circulator route within downtown to expand development potential at the ½-mile radius for transit-oriented development. While I prefer Main and Walnut why not now consider Main and Grand since these were your ten choices in the first place. In the future it could go north/south on Main south of Crown Center and then head north on Grand at 27<sup>th</sup> Street and then around at the River Market (3<sup>rd</sup> Street) then back up Main. This would only put one three blocks between the lines, expand and connect what is "downtown" and set the stage for future rail loops in downtown that radiate east-west, for example.
- If I had to pick one, it would be Main Street.



Open House #3 – September 20, 2011 Meeting Materials and Summary Results

#### **Tell Us What You Think**

Exhibits are on display today describing the recommended alternative for the Downtown Corridor AA. Take some time to review and talk with staff about them. Remember: Your input is important to the success of the project!

Name of Presentation Board	Information Described on the Board		
Welcome	Includes information about today's meeting.		
	Describes the planning process and time frame for the		
Process and Schedule	Downtown Corridor AA plus its connection to the <b>Greater</b>		
Process and Scriedule	<b>Downtown Area Plan</b> and <b>Smart Moves</b> vision for expanded		
	and enhanced transit in Kansas City.		
D	Outlines key elements of the Downtown Corridor AA Purpose		
Purpose and Need	and Need Statement.		
M. J. CT.	Describes the differences between two modes of transit: the		
Modes of Transit	modern streetcar and a bus with a dedicated travel lane.		
	Maps spanning the area from the River Market on the north,		
	through the Central Business District and the Crossroads areas		
August Alignment Alternatives	to Union Station and Crown Center on the south and showing		
	the two transit routes for the Downtown Corridor that were		
	presented to the public in August.		
	Describes the detailed alternatives assessment that narrowed		
Tier 2 Evaluation	the AA's route, type of transit, and "no-build" alternatives to a		
	single recommended alternative.		
September Recommended Alternative	Map illustrating the route the preferred alternative will travel.		
	Outlines the guiding principles and potential sources of funding		
How to Pay For It	for the starter line.		
N C.	Involves the immediate next steps in the project schedule,		
Next Steps	including a detailed technical and financial analysis.		
S. 1.6	Describes how to access additional project information and		
Stay Informed	who to contact for the project.		

#### **Get More Information**

For additional information, visit MARC's KC Smart Moves website, **www.kcsmartmoves.org**, and check back often to find project-related materials and announcements!

You may also contact Triveece Harvey, AICP, at Patti Banks Associates to schedule a presentation for your stakeholder group. You can reach Triveece:

by email at **tharvey@pbassociates.com** or by phone at 816-756-5690 ext. 3038





www.kcsmartmoves.org



# Review the Recommendation

Kansas City has a historical tie to the streetcar system, with streetcar operations beginning in the late 1800s and running through the 1950s. Modern streetcars similar to the one on display at the August 23 Streetcar Party, and recommended for the downtown starter line, are generally powered with electricity. They use a fixed-guideway (rail), share traffic lanes with automobiles, and carry up to 120 passengers.

Find out more about modern streetcars and the recommendation for the Downtown Corridor AA at today's open house by:

- Reviewing exhibits that describe the planning process, schedule, purpose and need for the Downtown Corridor AA, as well as the transit mode and alignment alternatives currently under evaluation.
- Discovering the differences between the modern streetcar and a bus circulator that uses a dedicated travel lane.
- **Talking with staff** about the detailed alternatives assessment that narrowed the AA's route (Grand Blvd. or Main St.), type of transit (streetcar or bus), and "no-build" alternatives to a single recommended alternative: a modern streetcar on Main St.
- Filling out a comment card before leaving the open house.

## Open House #3

## Streetcars Recommended for Main Street

The preferred type of transit and route for the downtown starter line will be a streetcar on Main Street. The Partnership Team, consisting of the city of Kansas City, Mo., Kansas City Area Transportation Authority (KCATA), Jackson County, and Mid-America Regional Council (MARC) developed the recommendation as part of the **Downtown Corridor Alternatives Analysis (AA)**. Exhibits related to the recommendation are on display **September 20** at **Arabia Steamboat Museum from 4 to 6:30 p.m.** for you to review during the open house.







Modern streetcar concept shared with the public at the August 23 Streetcar Party



## The study area for the Downtown Corridor AA (shown on the map below) extends approximately two miles from the River Market on the north, through the Central Business District and the Crossroads areas to Union Station and Crown Center on the south.

## Admiral Boulevan 8th Street 9th Street 10th Street 11th Street 12th Street (70) 16th Street 17th Street 35 (71) No. 20th Street 22nd Stree 23rd Street KC Corridor AA Study Area

### September Recommended Alternative

#### **Streetcars in Kansas City**

Walking along the sidewalks of downtown Kansas City you can still find remnants of the city's historic streetcar system. As the Downtown fixed transit solution streetcars would promote density and intensity of uses, making them particularly effective tools to spur economic development, link jobs with daily activities and destinations, and create quality places.

Streetcars fuel economic growth while providing transportation choice, whereas buses typically satisfy transportation needs but are not as effective at attracting developers who want to build along a permanent transit corridor. Because streetcars will not work everywhere, the AA describes how they could interact with Kansas City's existing bus service, such as the MAX bus rapid transit route and future Jackson County commuter rail opportunities.

The recent renaissance occurring in Downtown Kansas City will serve to maximize the opportunities for the success of the Downtown streetcar as "going Downtown" is once again becoming a major event like it was in the early 20th century, when people come to work, go to dinner, see a show, or experience any number of Kansas City's tourist draws.

What's more, there is a growing body of research that indicates there is a large portion of the population that wants to live and work in walkable urban areas. Streetcar transit allows people to live in an urban environment and make many of their daily trips conveniently without the use of an automobile, which will have a positive impact on air quality while simultaneously increase property values along the route.

#### Financing Main's Streetcar

The recommended alternative on display today will be financed by sources other than the existing dedicated transit sales taxes, and without sacrificing existing transit services. In fact, an important component of the Downtown Corridor AA is development of a reasonable capital and operations financing plan to secure funding for implementation.

The financing plan may potentially be used to apply for federal funds through New Starts, Small Starts, or other federal programs. Creative leveraging of private funding options, public/private partnership options, and federal grant opportunities will be explored. Ultimately, the preferred financing strategy will be one with great local support—voted on not through a city-wide initiative, but by targeted partners willing to invest in strengthening the downtown Kansas City economy through this project.





## Welcome

- Thank you for joining us at today's Downtown Corridor Alternatives Analysis (AA) public meeting!
  - Open House:4 p.m. 6:30 p.m.
- What You Can Do
  - Review the exhibits
  - Ask questions
  - Tell us what you think

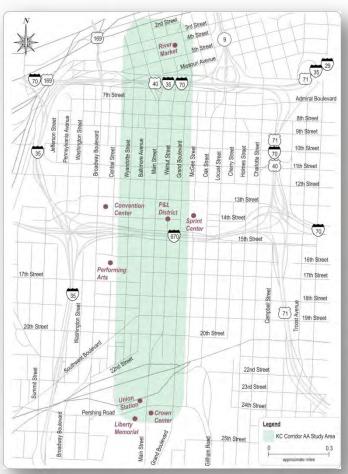


Please fill out a comment card before you leave.





## **Overview**



### **Downtown Corridor AA**

- Focused look at transit options in a corridor running from River Market to Union Station / Crown Center
- Result will be a single Locally
   Preferred Alternative, supporting
   downtown goals, investment, and
   the regional transit vision as well as
   the recommendations of Kansas
   City's Greater Downtown Area Plan
- Process funded by the Federal Transit Administration





### **Overview**







### **AA is Smart Moves Implementation**

- Smart Moves is Metro Kansas City's vision for expanded and enhanced regional transit service. Smart Moves:
  - Builds on on past plans and studies, reflects what residents and businesses say they desire in a public transit system, and incorporates best practices from around the country.
  - Expands current transit routes and recommends new service types, vehicles, and facilities.



## **Process & Schedule**

### **Stakeholder Outreach**

- Ongoing Meetings
  - Neighborhoods
  - Civic leaders
  - Transportation groups
  - Elected officials
  - Downtown Parking and Transportation Commission
  - Business/Economic development community
  - Media
- Three Public Open Houses
  - Held at key milestones



### **Time-frame**

- April June 2011
  - Purpose and Need Statement
  - Project goals and objectives
  - Identification of alternatives
- July September 2011
  - Detailed alternatives assessment
  - Alignment and mode determination
  - Financial strategy formation
- October December 2011
  - Detailed technical and financial analyses
- January 2012
  - Final report to Federal Transit
     Administration



## **Project Purpose**

The purpose of the project is to provide an attractive transit option that will more conveniently connect people and places within the Downtown Corridor, and support regional and city efforts to develop downtown Kansas City and the Downtown Corridor as a more vibrant and successful urban center.



## **Project Need:**

### Connect, Develop, Thrive & Sustain

### **Connect**

- Improve circulation within downtown
- Connect downtown activity centers
- Enhance and integrate multimodal transportation options
- Improve effectiveness and efficiency of existing transit services
- Improve pedestrian environment and accessibility
- Provide access to parks and recreational facilities



- Encourage development and redevelopment
- Provide a catalyst for redevelopment
- Increase number of downtown residents
- Support downtown's historical urban fabric and form
- Support transit-oriented development/ minimize the need for parking



## **Project Need:**

### Connect, Develop, Thrive & Sustain



- Strengthen downtown districts and support existing businesses
- Provide additional services for residents
- Support visitor and tourism activities
- Avoid future congestion
- Serve transit-dependent populations



### **Sustain**

- Promote long-term sustainable development
- Reduce vehicle-miles traveled
- Improve air quality
- Improve public health
- Promote walkability





## **Modes of Transit**

#### **Circulator Bus**



- Generally diesel-powered
- Generally on-street, but can have separated, fixed guideway
- Can carry up to 75 passengers

#### **Modern Streetcar**

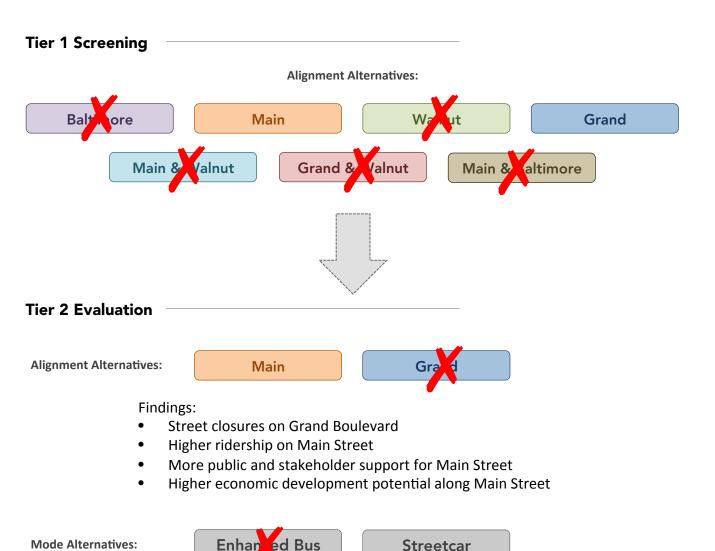


- Generally electrically powered
- Fixed guideway (rail); shares traffic lane with autos
- Can carry up to 120 passengers





#### Alternatives Evaluation: TIER 1 AND TIER 2 RESULTS



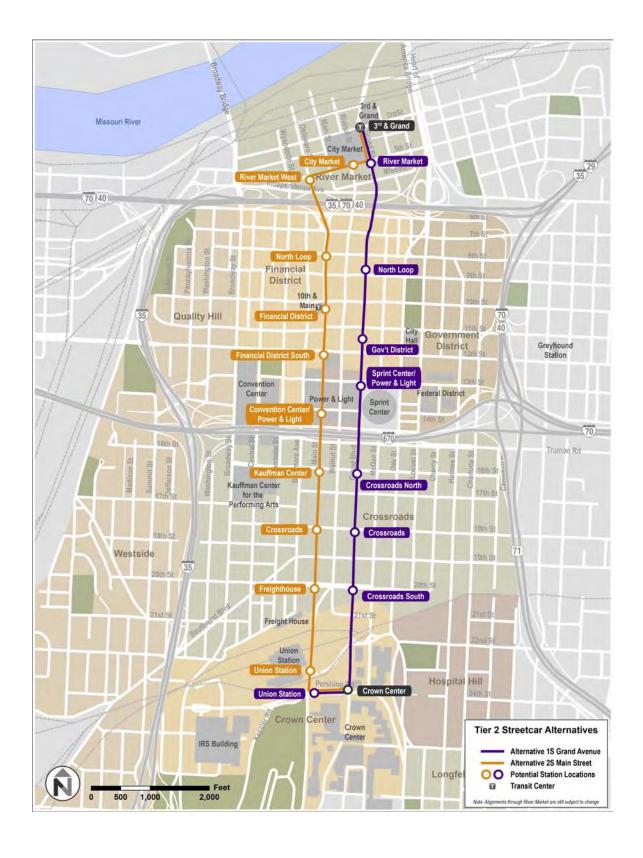
#### Findings:

- More public support for streetcar
- Higher projected ridership for streetcar
- Significant additional economic development potential from streetcar
- Lower operating cost per passenger for streetcar

Final Recommendation:	Main	Streetcar

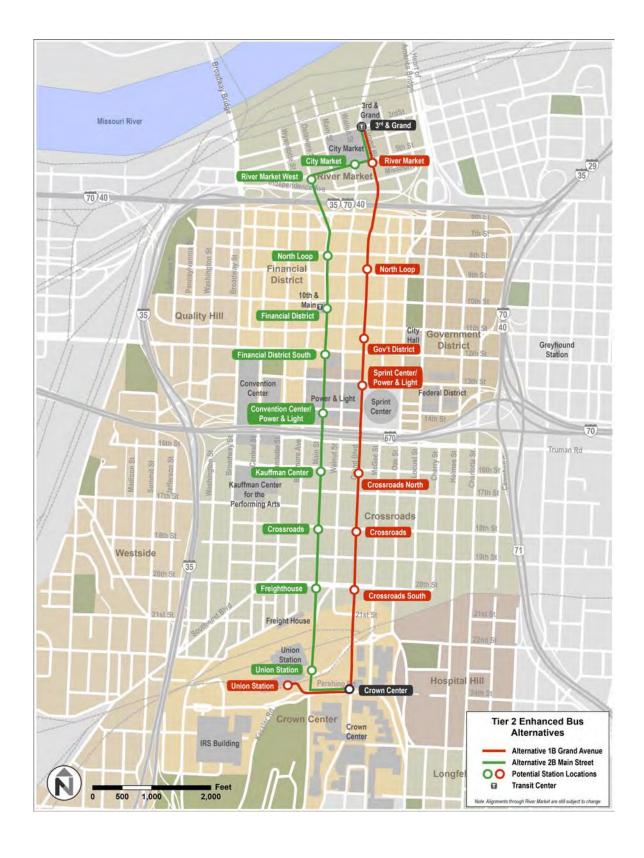


#### Alternatives Evaluation: STREETCAR ALTERNATIVES





#### Alternatives Evaluation: ENHANCED BUS ALTERNATIVES





#### Alternatives Evaluation: ENHANCED BUS vs. STREETCAR

**Decision 1: Alignment** 

**Main Street** 

10

**Grand Boulevard** 

#### **Decision 2: Technology**

Streetcar (SC)	Enhanced Bus (EB)
Higher capital costs	Lower capital costs
Appeals to choice riders	Not as attractive to choice riders
More comfortable ride	Less comfortable ride
Larger, roomier vehicle	Bus designs are becoming more attractive
Easier to understand and use	Less easy to understand and use
Bicycles accommodated on-board	Bicycles located on rack in front of bus
More iconic for City	Does not grab attention
Has been shown to spur development	Has less significant impact on development
More visual impacts from wires and tracks	Less visual impacts
Less flexibility for special events	More flexible for special events
No localized emissions	Localized emissions from buses
ROWSHIPO CONTROL OF THE PARTY O	RIDE FREE



#### Alternatives Evaluation: **CONNECT**

#### **Activity Center Connections**

Main EB and SC	Grand EB and SC			
Directly serves 10th & Main	Directly serves Sprint Center			
Closer to Convention Center Closer to Government District				
Closer to Kauffman Center				
All alternatives would directly serve River Market, Power & Light, Crown Center, 3 <sup>rd</sup> & Grand				

Main Street directly serves the 10<sup>th</sup> & Main Transit Center, while Grand Boulevard directly serves the Sprint Center.

Advantage: Main

#### **Activity Levels**

current activity within ¼ mile

	Main		Grand	
	EB	SC	EB	SC
Housing Units (2010)	3,200	3,200	2,900	2,700
Employees (2005)	47,200	47,200	50,900	50,900
Hotel Rooms (2005)	3,500	3,500	2,500	2,500
Special Event Annual Attendance (2010)	5.7 million	5.7 million	3.3 million	3.3 million

Main Street serves more population, special event venues and hotel rooms. Grand Boulevard serves more employment.

Advantage: Main

#### **Bicycle & Pedestrian Connectivity**

No significant distinction between alignments or modes —

All alternatives have generally good and similar walking and bicycling environments.

Advantage: none



#### **Alternatives Evaluation: DEVELOP**

#### **Existing Economic Activity**

within 3 blocks unless noted

Population (2010)
Housing Units (2010)
Housing Growth (2040)
Employees (2010)
Employment Growth (2040)
Hotel Rooms (2010)
Venues - Annual Attendance (2010)
Retail Sales Within 1 Block (2010)
Corridor Property Market Value (2010)

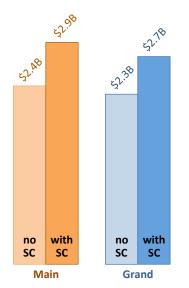
Main EB and SC	Grand EB and SC	
4,600	3,600	
3,900	3,100	
+5,900	+4,900	
52,300	50,100	
+30,800	+31,400	
3,500	2,500	
5.7 million	3.3 million	
\$93 million	\$97 million	
\$1,590 million	\$1,570 million	

All alternatives serve significant economic activity. Main Street serves more population, specia event venues and hotel rooms. Grand Boulevard serves more employment and has higher retail sales.

Advantage: none

#### **Economic Development Potential**

(Uninflated 2010 dollars)



**Projected Corridor Land Value in 2025** 

Enhanced bus would not be expected to induce a significant amount of new development Through 2025, streetcar would be expected to induce 77% and 70% more economic growth over baseline growth on Main Street and Grand Boulevard, respectively.

Advantage: Main Streetcar

All alternatives offer similar capacity for future development. Neither alignment would "run out" of development sites in the near to intermediate term

Advantage: none



#### Alternatives Evaluation: THRIVE

#### **Residential & Employment Activity**

 Main
 G

 EB
 SC
 EB

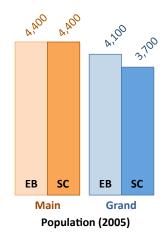
 Employees within ¼ mile (2005)
 47,200
 47,200
 50,900

 Population within ¼ mile (2010)
 4,400
 4,400
 4,100

EB SC EB SC

Employees (2005)

Grand



Grand

SC

50,900

3,700

serve more residential population, while Grand Boulevard alternatives would serve more employment.

Advantage: none

#### **Transit Reliability**

Main

number of street closures (6 months, 2011)

Grand has a significant number of annual street closures for special events, which would impact transit reliability.

Advantage: Main Streetcar or Main Enhanced Bus

#### **Public & Stakeholder Support**

Stakeholder and public comments can be summarized as:

- Overwhelming support for streetcar over bus
- Most liked the simplicity of the study alignments
- The Downtown Corridor should be considered a "starter" line with possible expansion in the future (airport, Waldo, Johnson County)
- Some liked Grand Boulevard because it would serve downtown employment and is straighter but some expressed concern about impacts on the Sprint Center
- Many liked Main Street because of its central location and connections to a variety of activity centers but some expressed concern about parking impacts

Overwhelming support for streetcar over bus. Main Street consistently received more numerous and more vocal support from the public and

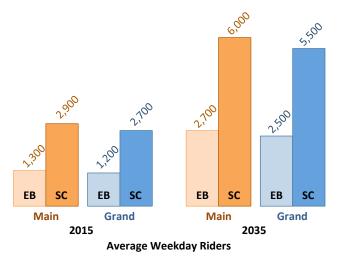
Advantage: Main Streetcar



#### **Alternatives Evaluation: SUSTAIN**

#### **Ridership**

	Main		Grand	
	EB	SC	EB	SC
2015 Ridership	1,300	2,900	1,200	2,700
2035 Ridership	2,700	6,000	2,500	5,500



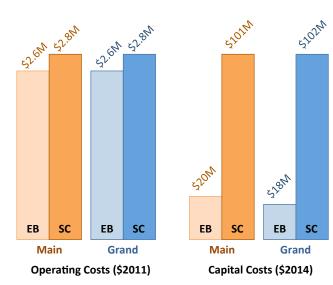
have significantly higher ridership than enhanced bus.
The Main Street alternatives would carry approximately 9% more riders than the Grand

Advantage: Main Streetcar

#### **Capital and Operating Costs**

Capital Cost (\$2014)
Operating Cost (\$2011)

Ma	ain	Gra	and
EB	SC	EB	SC
\$20M	\$101M	\$18M	\$102M
\$2.6M	\$2.8M	\$2.6M	\$2.8M



Estimated capital costs for the streetcar alternatives are higher than for the enhanced bus alternatives, but operating costs are similar between modes.

Neither capital nor operating costs would differ substantially between alignments.

Advantage: Main or Grand Enhanced Bus



#### **Alternatives Evaluation: SUSTAIN**

#### **Service Effectiveness**

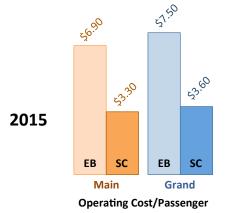
(\$2011)

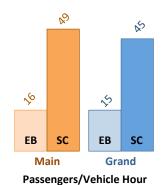
2015 Operating Cost/Passenger
2035 Operating Cost/Passenger
2015 Passengers/Vehicle Hour
2035 Passengers/Vehicle Hour

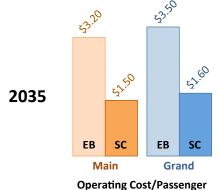
•				
Main		Grand		
EB	SC	EB	SC	
\$6.90	\$3.30	\$7.50	\$3.60	
\$3.20	\$1.50	\$3.50	\$1.60	
16	49	15	45	
35	107	32	98	

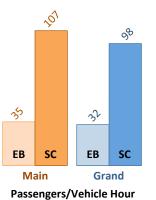
Streetcar alternatives are projected to carry significantly more passengers per revenue hour, would have a lower operating cost per passenger, and would have a higher capital cost per passenger. The Main Street alignment is slightly more effective than Grand Boulevard.

Advantage: Main Streetcar









#### **Environmental & Historic Resources**

No significant impacts —

A preliminary evaluation suggests that neither alignment would have significant impacts on environmental or historic resources.

Advantage: none



#### **Alternatives Evaluation: EVALUATION FINDINGS**

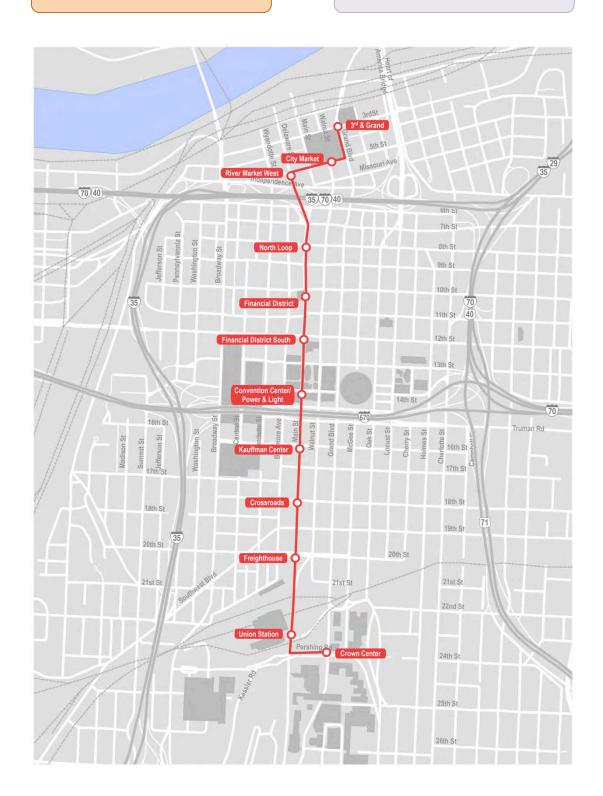
	Alignment	Mode
Activity Center Connections:	MAIN	none
Activity Levels:	MAIN	none
Bicycle & Pedestrian Connectivity:	none	none
Existing Economic Activity:	none	none
Economic Development Potential:	MAIN	STREETCAR
Residential & Employment Activity:	MAIN	STREETCAR
Transit Reliability:	MAIN	none
Public & Stakeholder Support:	MAIN	STREETCAR
Ridership Projections:	MAIN	STREETCAR
Capital & Operating Costs:	none	ENHANCED BUS
Service Effectiveness:	MAIN	STREETCAR
Environmental & Historic Resources:	none	none



#### Alternatives Evaluation: RECOMMENDED ALTERNATIVE

#### **MAIN STREET**

#### **STREETCAR**





## **How to Pay for It?**

### Guiding Principles

- No dedicated city-wide sales or property tax
- Fixed rail creates "permanence" that spurs investment
- No diversion of KCATA funding

### Potential Sources of Funding

- Rider fares
- District sales tax and/or special assessments (only within corridor)
- Federal grants
- Advertising and naming rights
- Other sources consistent with guiding principles







## **Next Steps**

### **Stakeholder Outreach**

- Ongoing Meetings
  - Neighborhoods
  - Civic leaders
  - Transportation groups
  - Elected officials
  - Downtown Parking and Transportation Commission
  - Business/Economic development community

### **Time-frame**

- October December 2011
  - Detailed technical and financial analyses
- January 2012
  - Final report to Federal Transit
     Administration





## **Stay Informed**

- Keep up with the latest on the Downtown Corridor AA by:
  - Bookmarking our web siteat: <a href="https://www.kcsmartmoves.org">www.kcsmartmoves.org</a>
  - Scheduling a presentation for your group via:
    - Triveece Harvey,
       Patti Banks Associates at:
       <u>tharvey@pbassociates.com</u>
       and 816-756-5690 x. 3038











Thursday, May 12, 2011

Posted on Wed, May. 11, 2011

### Every old problem is new again in Kansas City

By YAEL T. ABOUHALKAH The Kansas City Star

A number of big challenges face Kansas City.

Young kids are congregating on the Country Club Plaza, raising concerns about the shopping district's reputation with visitors. The city's violent crime rate is one of the nation's highest. The Kansas City School District is performing poorly, scaring away homeowners and businesses. The area's mass transit system is among the worst in the country.

Hang on a second. Let me check my notes.

Actually, while all those challenges should sound familiar to residents in 2011, they are culled from longago events.

- •The Plaza problem made news in 1984 when break dancers were arrested for blocking sidewalks.
- •In 1992 Kansas City suffered from 12,596 violent crimes and 152 homicides.
- •The school district in 1994 was criticized for its awful scores, back when it had more than 36,000 students.
- •Mayor Emanuel Cleaver in 1995 called a proposed light-rail line a "touristy frou-frou" project, essentially killing it then and long into the future.

This is more than a trip down memory lane, of course. Some of Kansas City's troubles of 2011 have a long, long history. That means they often crop up in campaigns. In his bid for mayor, for example, Sly James said he wanted to attack several of these problems. Now he has that chance.

But as James will find out, the city's leaders and residents have had varying degrees of success in dealing with these challenges.

On Wednesday, a City Council committee discussed problems with unruly teens gathering on the Plaza. They have spurred the usually ineffective calls for more parental supervision and the creation of more activities for young people.

This is a challenge that has had few tangible answers for many years. The unknowns are numerous, which stymies real progress: Where would the activities take place? Who would pay for them? Who would be in charge of organizing them?

Crime is a more positive story.

The number of violent crimes reported in 2010 in Kansas City fell just below 5,400 — for a staggering drop of 57 percent since 1992. The number of homicides was down 30 percent from that year. There also were fewer rapes, robberies, aggravated assaults and murders in a city that has gained population the last two decades.

This is a safer city than it was back then.

One continuing concern, though, is that many other large cities also have had big reductions in violent crime over the same time span. So Kansas City's crime rate remains far higher than average.

The Kansas City School District is carving out another semi-success story.

It has taken aggressive action to cut its bloated costs by shedding employees and closing schools. That allows the district to focus more of its resources on the classroom, where only 17,000 students remain. That smaller size should make it more possible to improve the district.

Again, a caveat: Test scores are still near the bottom of the barrel. Plus, many people still think that the district covers most of the city, damaging the entire community's reputation in their eyes. However, parents can live north of the Missouri River or in parts of the city south of the river and send their children to different, often better schools.

Finally, a new study on transit scheduled to be released today by the Brookings Institution says the Kansas City metropolitan region ranks 90th out of 100 urban areas in the level of transit combined with its access to jobs.

So we don't have a good transit system and what we do have does a poor job of getting people to work.

Adding bus rapid transit lines has boosted the system in recent years, and plans for streetcars and heavy-rail lines once again are being studied.

Still, Kansas City's bus system is wholly inadequate despite all the public money spent on it, the suburbs continue to sprawl further from the core, and efficient mass transit pretty much remains a dream in this city and region.

Pretty much like it was in 1995.

To reach Yael T. Abouhalkah, call 816-234-4887 or send email to <u>abouhalkah@kcstar.com</u>. He appears on "Ruckus" at 7 tonight on KCPT, Channel 19.

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Thursday, May 12, 2011

Posted on Wed, May. 11, 2011

### In border business battle, Kansas City mayor fires back

By KEVIN COLLISON The Kansas City Star

In his first remarks since taking office on a cross-border business incentive war that has gained national attention, Mayor Sly James said Wednesday that Kansas City no longer would "sit on the sidelines" and watch Kansas poach its businesses.

The new mayor was among the dignitaries at an event at Boulevard Brewery marking the kickoff of an effort to retain businesses by the Kansas City Economic Development Corp.

He praised the plan and then laid down the gauntlet to Kansas.

"We need to compete with Minneapolis and Dallas, not Overland Park," James said. "That's a waste of time and money.

"The days of sitting back and watching it happen are over. Mutually assured destruction only works if both sides are armed. They have a gun. We have a Popsicle stick."

James also praised 17 senior area business leaders who signed a letter early last month asking the governors of Kansas and Missouri to stop using incentives to attract businesses within the metropolitan area.

In Wyandotte County on Wednesday, to announce the coming Farm Aid concert, Kansas Gov. Sam Brownback denied that his state was targeting Kansas City, Mo.

"Kansas is open for business, but we're not poaching businesses," he said. "We're going anywhere we can to recruit."

The governor also said he had not dismissed the business leaders' request.

"We're not blowing anything off, but also we're open for business around the country. And that's what we're doing. Not targeting."

One of the most effective tools used by Kansas allows companies to keep 95 percent of their employee withholding taxes for up to 10 years. It mirrors a similar Missouri job attraction program with one important difference — Kansas allows companies to get cash up front.

The use of incentives to encourage companies to move a few miles across the state line in the Kansas City area has been cited in national stories in recent weeks by The New York Times and Bloomberg.

The new business retention initiative, called KC BEST, short for Business Expansion and Support Team, has been discussed by the EDC for three years.

Efforts were stepped up over the past year when large companies moved to Overland Park, including JPMorgan Retirement Plan Services and KeyBank Real Estate Capital.

In recent months, AMC Entertainment has been offered \$47 million in incentives to move from downtown to Kansas.

Legislation is being considered by Missouri lawmakers that would give the city more help in trying to keep companies such as AMC. It would allow companies in jeopardy of moving to retain 100 percent of their withholding tax for 10 years, but would be capped annually at \$6 million.

Though it's expected to fall far short of the value of the package being offered by Kansas, it should boost the city's case, said Jeff Kaczmarek, the EDC's president and chief executive.





Thursday, May 5, 2011

Posted on Thu, Apr. 28, 2011

## Less expensive to build, streetcars could be KC's entry to light rail

By MICHAEL MANSUR The Kansas City Star

Whenever the topic of light rail comes up in Kansas City, many people just roll their eyes.

If it ever happens, they think, it will take years. And millions — if not billions — of dollars would have to come from who knows where.

But for some that view changed Wednesday night in a meeting room at the Central Library downtown.

"I'm very optimistic that we're not just studying it again," Sherri McIntyre, an assistant city manager, told those in attendance. "We're going to do it."

McIntyre, backed by transit advocates Janet Rogers and Mark McDowell, detailed for members of the Downtown Neighborhood Association plans for a two-mile-long starter line of modern streetcars that have become popular in many cities.

Such sleek, lighter forms of light rail could run from the River Market area to Union Station or Crown Center. Streets they would probably serve include Grand, Main and Walnut, although the exact route will be determined in coming months.

Its cost: an estimated \$50 million to \$70 million.

As envisioned, citywide taxpayer dollars won't be needed. Instead, the group intends to find some creative local funding alternatives that wouldn't require another citywide light rail election, a road Kansas City voters have been down many times before.

"Kansas City has put a lot of time and money in studying light rail," said Charlie Hales, manager of the project to study downtown transit options. "But this is a very wise shift to some projects that are small, manageable, and we can do them now."

McIntyre told the Downtown Neighborhood Association, the first group that she and her transit allies have pitched the streetcar proposal to, that pushing again for passage of a citywide tax would result in having to stretch a rail line so it serves enough voters to win passage.

But a longer line also boosts the costs and eventually deflates voter support, she said, so a smaller and less costly starter line might be the recipe for success.

Indeed, streetcar advocates nationwide said such lines had been constructed fairly quickly and for as little as \$25 million per mile. It also doesn't take long to construct a mile of streetcar line because existing streets are used and excavated only a foot or so to lay the rail lines.

Two miles of streetcar line might be built in a matter of weeks or a few months, experts said.

The study now under way and expected to be completed by fall will lay out not only possible routes but also funding mechanisms.

The preference, city officials and transit advocates said, is to find local funding for the starter line.

McDowell said one option would be creating a Transportation Development District. TDDs have never been widely discussed in Kansas City.

But they're becoming a fairly common financing method elsewhere, said Hales, who works for HDR Inc., an engineering company that has built streetcar lines, including one in Portland, Ore.





Thursday, May 12, 2011

Posted on Mon, May. 09, 2011

## KC's Downtown Council shifts away from its main mission

By KEVIN COLLISON The Kansas City Star

The Downtown Council, one of Kansas City's most effective organizations, particularly since it began its improvement district in 2003, has drifted from its core mission the past couple of years.

Last week's board meeting was a case in point.

At the meeting, it was reported that the organization was pursuing a proposal to renovate the historic Boone Theater at 1701 E. 18th St. and make it the new home of the National Folk Alliance. But it also was disclosed that the annual spring urban housing tour had been canceled.

No doubt, restoring the decrepit Boone Theater and making it a new entertainment anchor for the 18th and Vine District would be a good thing. But is that the job of an organization whose prime mission is attracting jobs, residents and retailers to downtown?

The same applies to the organization's promotion of citywide education issues. Not much of a factor when it comes to downtown.

Technically, the 18th and Vine District is on the edge of greater downtown as defined by the Downtown Council. Two years ago the Jazz District Redevelopment Corp. asked the organization to help make good the huge public investments there.

The theater built in 1922 was converted into an armory in the 1940s and then abandoned in the 1970s. The Downtown Council has applied for a \$200,000 grant from the National Endowment for the Arts and has made the final cut from 400 to 35 applicants.

That money would get the ball rolling to relocate the National Folk Alliance from Memphis by renovating the theater into performance space and offices. The entire endeavor would cost about \$3 million.

The organization's development arm has been instrumental in several major downtown endeavors, including the new Central Library, the demolition of the Shoppers Parkade building, the new Bolender ballet school by Union Station, and the new community kitchen at 1444 E. Eighth St.

Sean O'Byrne, vice president of business development, said the 18th and Vine effort was a natural step.

"It is part of the downtown district, and now that downtown has a good foothold, we can help out in that area," he said. "The downtown development group takes on deals other folks can't do."

But the cancellation of the housing tour, a popular event for 10 years, shows the foothold is tenuous. It's particularly bad timing when the Downtown Council has said doubling the population over the next few years is a major priority.

The problem: The supply of apartments is dwindling as the pipeline of projects dries up, and the for-sale condominium market is in the doldrums. Pushing for more apartment developments should be a major priority.

In his report to the Downtown Council, Donovan Mouton, the housing committee chairman, said only 12 projects had interest in participating in the tour this year, down from 18 last year.

To salvage something, there will be a scaled-back tour in mid-September to coincide with the opening of the Kauffman Center for the Performing Arts. The scaled-back tour will not feature the bus tours and hoopla of previous years.

There are other areas of concern.

So far a major new employer hasn't chosen downtown since the huge investment made in the Power & Light District five years ago. Since then, downtown has lost at least one major employer, KeyBank Real Estate Capital, and is in jeopardy of losing AMC Entertainment.

Attracting employees, residents and retailers is essential to reviving downtown. Although there has been a good start — downtown was about the only area of Kansas City south of the Missouri River to grow in population in the 2010 census — there's still a long ways to go.

Maybe it's time for the Downtown Council to return to the basics.

How about this for a priority? Last week the board was told by Sherri McIntyre from City Hall that a study on a proposed two-mile streetcar line from Crown Center to the River Market should be completed by the end of this year.

The problem, she predicted, is that it would take at least until mid-2013 before any construction could begin on what's been described as a very affordable and doable project. Speeding that timetable would be a fine goal for the Downtown Council.

To reach Kevin Collison, call 816-234-4289 or send email to kcollison@kcstar.com.

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